

R.H. MUETH

catalog 164

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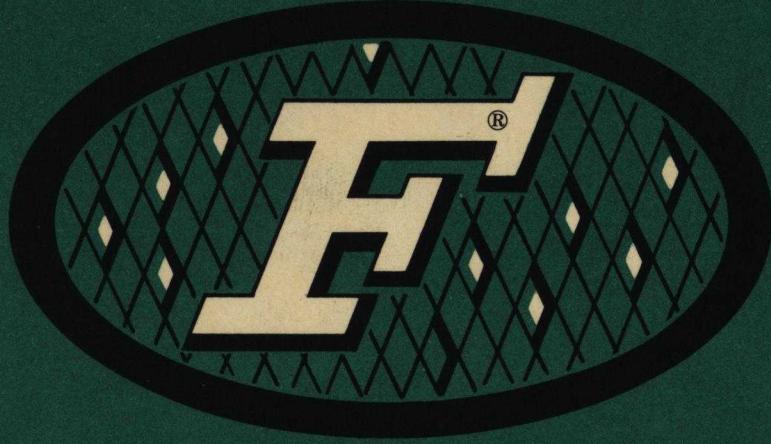
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CONSTRUCTION
CASTINGS

- MANHOLE FRAMES & COVERS
• CASTINGS FOR DRAINAGE • CATCH
BASIN GRATINGS • SEWAGE LINE CASTINGS
• WATER LINE CASTINGS • TRENCH GRATINGS
• WHEEL GUARDS

Castings covered in this catalog comprise the Flockhart line for the construction and allied industries. If your interest is exclusively marine send for Catalog No. 143 — "Dock Fittings & Castings."

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VICTOR IRON WORKS

FLOCKHART CASTINGS

For the construction and allied industries, FLOCKHART FOUNDRY COMPANY manufactures a great variety of castings in the materials described below. Unless otherwise noted, these castings are made in the *finest quality* grey cast iron.

CAST IRON: Conforms to ASTM specification A-48 (latest revision), class 30 . . . develops a minimum ultimate strength of 30,000 psi. Because of its mechanical and physical properties and its low cost, cast iron—properly designed, is a highly desirable construction metal.

DUCTILE (Nodular) IRON: Conforms to ASTM specification A-339 (latest revision) in two grades . . . (1) alloy 60-45-10 which develops minimum tensile strength of 60,000 psi—minimum yield strength of 45,000 psi—minimum elongation of 10% and (2) alloy 80-60-03 which develops minimum tensile strength of 80,000 psi—minimum yield strength of 60,000 psi—minimum elongation of 3%. This newly developed metal combines the superior qualities of cast iron with the strength of cast steel. Because of relatively low cost, it is admirably suited for construction castings. Further information is available on request.

ALUMINUM: Conforms to ASTM specification B-26 (latest revision) . . . and TEN-ZALOY specification ZC-81A.

CAST STEEL: Conforms to ASTM specification A-27 (latest revision) in two grades . . . (1) alloy 60-30 and (2) alloy 65-35.

CAST BRONZE: To specification.

ENGINEERING SERVICE

With every Flockhart product goes a dividend of more than 80 years of sound, practical experience . . . experience in construction castings, armored concrete, wheel guards and related castings. All this know-how is available to architects, highway engineers, municipal officials—through the Flockhart engineering staff. For assistance in application of any products covered in this catalog or in the design of special products contact our Department of Research and Development.

VARIATIONS FROM STANDARD

Many variations of Flockhart manhole frames, covers, gratings and other castings are available. Variations from standard are listed below, with identifying number.

- | | | |
|--------------------------------|----------------------------------|----------------------------------|
| 1 depth and flange dimensions | 8 lock operated internally | 14 square flange |
| 2 covers for concrete fill | 9 cast aluminum cover or grating | 15 lettering on cover |
| 3 horizontal, vertical milling | 10 steel plate cover | 16 cast bronze |
| 4 horizontal milling | 11 grating cover | 17 asbestos gasket |
| 5 flush lift rings | 12 aluminum plate | 18 cast steel cover |
| 6 drop lift handles | 13 concentric covers | 19 ductile iron cover or grating |
| 7 lock operated externally | | |

HOW TO ORDER

Flockhart castings are easy to order. Within each major "family" of castings—manhole frames, for example—each group is assigned a *type number* (such as type 600). Then within each group, each flange is given its own individual *code number* (such as 62000). Consequently, when ordering practically any Flockhart casting in this catalog, it is only necessary to give two numbers . . . (1) the *type number* of the group and (2) the *code number* of the desired combination of variables.

FLOCKHART GUARANTEE

Any casting designated ROADWAY that breaks in roadway service within a period of 10 years from date of invoice will be replaced gratis.

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FLOCKHART CONSTRUCTION CASTINGS

MANHOLE FRAMES AND COVERS

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Wheel Guards	28,29

OTHER FLOCKHART CASTINGS

FOR SEWERS, WATERWORKS: air vents for water mains, lift valves, pressure relief valves, slide valves, shear gate valves, wall sleeves, sludge shoes, stop plank grooves.

FOR BRIDGES: scuppers, railing posts, etc. . . . Write for complete drawing file.

FOR DOCKS: bollards, bits, cleats, chocks—made in cast iron, ductile iron, cast steel, capstan frames, and covers, mooring eyes . . . Write for Dock Castings Catalog No. 143.

ALSO: adaptor rings, port bases, airport mooring eyes, chimney caps, heavy duty platform guards.

MANHOLE FRAMES COVERS GRATINGS

standard

• circular • for pit construction

for sanitary and storm manholes in municipalities, housing developments, schools, manufacturing plants, parking lots; built for heavy duty; economical

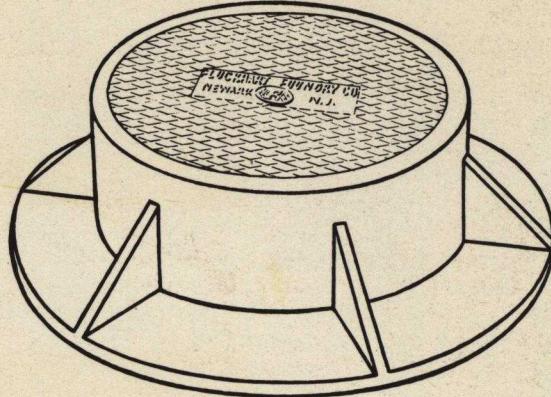
variations: 1, 2, 3, 4, 5, 6, 7, 8, 14, 15, 18, 19
(page 2)

guarantee: ROADWAY types for 10 years

ordering: see page 2; also specify plane or concave grating

for square frames and covers: pages 10, 11

for rectangular frames and covers: pages 12, 13

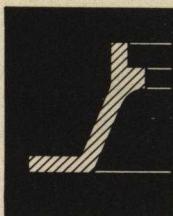


ROADWAY Type 684-D							circular flange	square flange	circular flange	square flange	circular flange	square flange
E	A	B	C	D	F	T	with cover		with plane grating		with concave grating	
10 $\frac{1}{4}$	14	12 $\frac{1}{4}$	12	8	17	1 $\frac{1}{4}$	63300	63301	63302	63303	63304	63305
15	18 $\frac{3}{4}$	16 $\frac{1}{4}$	16 $\frac{1}{2}$	8	27	1 $\frac{1}{4}$	63306	63307	63308	63309	63310	63311
18	21 $\frac{1}{4}$	20 $\frac{1}{2}$	20	8	29	1 $\frac{1}{2}$	63312	63313	63314	63315	63316	63317
22	26	24 $\frac{1}{4}$	24	7	32	1 $\frac{1}{4}$	63318	63319	63320	63321	63322	63323
22	26	24 $\frac{1}{4}$	24	8	32	1 $\frac{1}{4}$	63324	63325	63326	63327	63328	63329
24	28	26	25 $\frac{1}{4}$	6	34	1 $\frac{1}{2}$	63330	63331	63332	63333	63334	63335
24	28	26	25 $\frac{1}{4}$	8	34	1 $\frac{1}{2}$	63336	63337	63338	63339	63340	63341
24	28	26	25 $\frac{1}{4}$	9 $\frac{1}{4}$	34	1 $\frac{1}{2}$	63342	63343	63344	63345	63346	63347
27	31	29	28 $\frac{3}{4}$	7	37	1 $\frac{3}{8}$	63348	63349	63350	63351	63352	63353
30	34	32	31 $\frac{1}{4}$	6 $\frac{1}{2}$	40	1 $\frac{1}{2}$	63354	63355	63356	63357	63358	63359
30	34 $\frac{1}{2}$	32 $\frac{1}{2}$	32	8	40	1 $\frac{1}{2}$	63360	63361	63362	63363	63364	63365
36	40 $\frac{1}{2}$	38	37 $\frac{3}{4}$	7	46	1 $\frac{1}{2}$	63366	63367	63368	63369	63370	63371
42	46	44	43 $\frac{3}{4}$	8	52	1 $\frac{1}{2}$	63372	63373	63374	63375	63376	63377
48	52	50	49 $\frac{3}{4}$	8	58	1 $\frac{1}{2}$	63378	63379	63380	63381	63382	63383
54	58	56	55 $\frac{3}{4}$	8	64	1 $\frac{1}{2}$	63384	63385	63386	63387	63388	63389
60	64	62	61 $\frac{1}{4}$	8	70	1 $\frac{1}{2}$	63390	63391	63392	63393	63394	63395
WALKWAY Type 618-D							with cover		with plane grating		with concave grating	
8	11 $\frac{1}{2}$	10	9 $\frac{1}{4}$	8	16 $\frac{1}{2}$	1	61104	61105	61102	61103	61100	61101
12	16	14 $\frac{1}{2}$	14	6	23	1	61110	61111	61108	61109	61106	61107
18 $\frac{1}{4}$	22 $\frac{1}{2}$	20 $\frac{1}{2}$	5	29	1		61116	61117	61114	61115	61112	61113
22	25 $\frac{1}{4}$	24 $\frac{1}{4}$	24	6	36	1 $\frac{1}{8}$	61122	61123	61120	61121	61118	61119
22	26	24 $\frac{1}{4}$	24	6	44	1 $\frac{1}{8}$	61124	61125			61126	61127
24	28	26 $\frac{1}{4}$	26	6	34	1	61130	61131	61128	61129	61132	61133
28	31 $\frac{1}{8}$	30 $\frac{1}{4}$	30	4 $\frac{1}{2}$	39 $\frac{1}{4}$	$\frac{3}{4}$	61136	61137	61134	61135		
30	34	32 $\frac{1}{4}$	32	6	43	1 $\frac{1}{4}$	61142	61143	61140	61141	61138	61139
34	37	36	35 $\frac{1}{4}$	5 $\frac{1}{4}$	46	1 $\frac{1}{8}$	61148	61149	61146	61147	61144	61145
36	39 $\frac{1}{2}$	38	37 $\frac{3}{4}$	4 $\frac{1}{4}$	48	1 $\frac{1}{4}$	61154	61155	61152	61153	61150	61151
42	45 $\frac{1}{2}$	44	43 $\frac{3}{4}$	6	54	1 $\frac{1}{4}$	61160	61161	61158	61159	61156	61157
48	51 $\frac{1}{2}$	50	49 $\frac{3}{4}$	6	58	1 $\frac{1}{4}$	61166	61167	61164	61165	61162	61163

MANHOLE FRAMES COVERS

standard

● circular • for pit construction

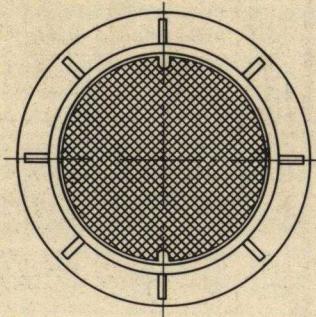
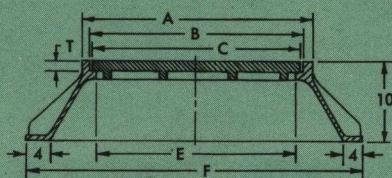


furnished with either square or round flange

variations: 1, 3, 4, 5, 6, 7,
8, 9, 11, 15, 16, 18, 19
(page 2)

guarantee: ROADWAY types
for 10 years

ordering: see page 2; also
specify plane or concave
grating



E	A	B	C	F	T	circular flange	square flange
ROADWAY type 615-B with cover							
24	28	26	25 $\frac{3}{4}$	43	1 $\frac{1}{2}$	60880	60881
27	31	29	28 $\frac{3}{4}$	46	1 $\frac{1}{2}$	60882	60883
30	34	32	31 $\frac{1}{4}$	49	1 $\frac{3}{8}$	60884	60885
36	40 $\frac{1}{2}$	38 $\frac{1}{2}$	38	55	1 $\frac{1}{2}$	60892	60893
42	47	44	43 $\frac{3}{4}$	61	1 $\frac{1}{2}$	60996	60997
WALKWAY type 615-B with cover							
24	28	26	25 $\frac{3}{4}$	43	$\frac{3}{4}$	60886	60887
27	31	29	28 $\frac{3}{4}$	46	$\frac{3}{4}$	60888	60889
30	34	32	31 $\frac{1}{4}$	49	$\frac{3}{4}$	60890	60891
36	40 $\frac{1}{2}$	38 $\frac{1}{2}$	38	55	1 $\frac{1}{2}$	60894	60895
42	47	44	43 $\frac{3}{4}$	61	1 $\frac{1}{2}$	60998	60999

● circular • for pit construction

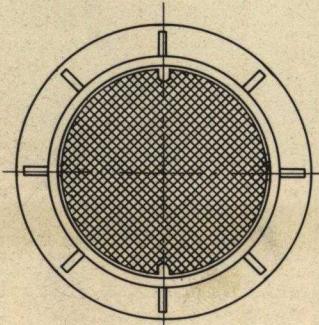
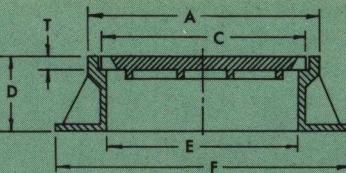


furnished with either square or round flange

variations: 1, 2, 3, 4, 5, 6,
7, 8, 9, 14, 15, 18, 19
(page 2)

guarantee: 10 years

ordering: see page 2



E	A	C	D	F	T	circular flange	square flange
ROADWAY type 604-C with cover							
15 $\frac{1}{4}$	19 $\frac{1}{2}$	17 $\frac{1}{2}$	8	24	1	60461	60450
24	28 $\frac{1}{2}$	26	6	38	1 $\frac{1}{2}$	60462	60451
24	28 $\frac{1}{2}$	26	8	38	1 $\frac{1}{2}$	60463	60452
26 $\frac{1}{2}$	31	28 $\frac{1}{4}$	10	37	1 $\frac{1}{4}$	60464	60453
30	34 $\frac{1}{2}$	32	8	44	1 $\frac{1}{2}$	60465	60454
30	35 $\frac{1}{2}$	32 $\frac{1}{4}$	12	46	1 $\frac{1}{2}$	60466	60455
34	39 $\frac{1}{2}$	36 $\frac{1}{4}$	11	46 $\frac{1}{2}$	1 $\frac{1}{2}$	60467	60456
36	41 $\frac{1}{2}$	37 $\frac{7}{8}$	8	48	1 $\frac{1}{2}$	60468	60457
36	42 $\frac{1}{2}$	38 $\frac{1}{4}$	12	48	2	60469	60458
42	46 $\frac{1}{4}$	44 $\frac{1}{2}$	10	58	3	60470	60459
48	53	49 $\frac{1}{8}$	10	57 $\frac{1}{4}$	1 $\frac{1}{2}$	60471	60460

* May be varied as desired

MANHOLE FRAMES COVERS GRATINGS

standard

● circular • for slab construction

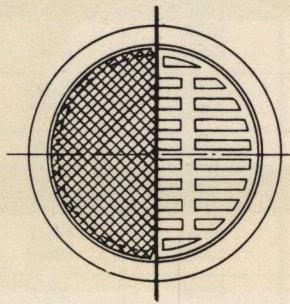
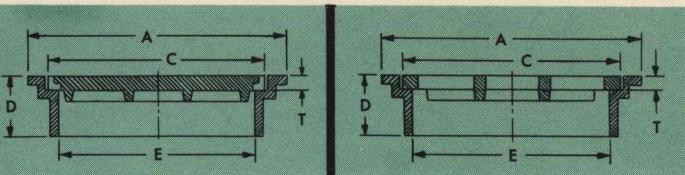


flanges may be increased to any desired square rectangle or circle; dimension D may be varied as desired

varyations: 1, 3, 4, 5, 6, 7, 8, 9, 10, 18, 19 (page 2)

guarantee: ROADWAY types for 10 years

ordering: see page 2; also specify proper depth



E	A	C	T	depth, D, in.					depth, D, in.				
				4½	6	8	10	12	4½	6	8	10	12

ROADWAY type 612-H

6	12	8	1	61905	61906	61907	61908	61909	61900	61901	61902	61903	61904
9	15	11	1	61915	61916	61917	61918	61919	61910	61911	61912	61913	61914
12	19	14	1	61925	61926	61927	61928	61929	61920	61921	61922	61923	61924
16	22	18	1¼	61935	61936	61937	61938	61939	61930	61931	61932	61933	61934
18	24	19	1½	61945	61946	61947	61948	61949	61940	61941	61942	61943	61944
20	28½	23	1¼	61955	61956	61957	61958	61959	61950	61951	61952	61953	61954
24	32½	26	1½	61965	61966	61967	61968	61969	61960	61961	61962	61963	61964
30	36½	32	1½	61975	61976	61977	61978	61979	61970	61971	61972	61973	61974
36	42½	38	1½	61985	61986	61987	61988	61989	61980	61981	61982	61983	61984
42	50	44	1½	61995	61996	61997	61998	61999	61990	61991	61992	61993	61994
48	56	50	1½	63205	63206	63207	63208	63209	63200	63201	63202	63203	63204
54	62	56	1½	63215	63216	63217	63218	63219	63210	63211	63212	63213	63214
60	68	62	2	63225	63226	63227	63228	63229	63220	63221	63222	63223	63224

WALKWAY type 630-H

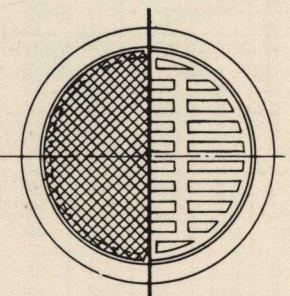
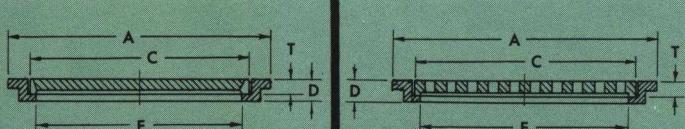
E	A	C	T	with cover					with plane grating				
				4½	6	8	10	12	4½	6	8	10	12
6	12	8	1	62800	62801	62802	62803	62804	62805	62806	62807	62808	62809
9	15	11	1	62810	62811	62812	62813	62814	62815	62816	62817	62818	62819
12	19	14	1	62820	62821	62822	62823	62824	62825	62826	62827	62828	62829
16	22	18	1¼	62830	62831	62832	62833	62834	62835	62836	62837	62838	62839
18	24	19	1½	62840	62841	62842	62843	62844	62845	62846	62847	62848	62849
20	28½	23	1¼	62850	62851	62852	62853	62854	62855	62856	62857	62858	62859
24	32½	26	1½	62860	62861	62862	62863	62864	62865	62866	62867	62868	62869
30	36½	32	1½	62870	62871	62872	62873	62874	62875	62876	62877	62878	62879
36	42½	38	1½	62880	62881	62882	62883	62884	62885	62886	62887	62888	62889
42	50	44	1½	62890	62891	62892	62893	62894	62895	62896	62897	62898	62899
48	56	50	1½	62900	62901	62902	62903	62904	62905	62906	62907	62908	62909
54	62	56	1½	62910	62911	62912	62913	62914	62915	62916	62917	62918	62919
60	68	62	2	62920	62921	62922	62923	62924	62925	62926	62927	62928	62929

● circular • for slab construction



varyations: 1, 3, 4, 5, 6, 9, 10, 15, 16, 18, 19 (page 2)

ordering: see page 2



WALKWAY type 621-Q

E	A	C	D	T	with cover					plane			concave			
					4½	6	8	10	12	4½	6	8	10	12	4½	6
6	10	7	1⅓	¾						60000			60002		60001	
9	13	10	1⅓	¾						60003			60005		60004	
12	16	13	1⅓	¾						60006			60008		60007	
16	20½	17	1⅓	¾						60009			60011		60010	
18	22½	19	1⅓	¾						60012			60014		60013	
20	24	21	1⅓	1¼						60015			60017		60016	
24	28	25	1⅓	1¼						60018			60020		60019	
27	31	28½	1⅓	1¼						60021			60023		60022	
30	34½	31	1⅓	1¼						60024			60026		60025	
32	38	34	2½	1½						60027			60029		60028	
36	41	37½	2	1¼						60030			60032		60031	
42	47	43½	2	1¼						60033			60035		60034	
48	53	49½	2	1¼						60036			60038		60037	
54	59	55½	2	1¼						60039			60041		60040	

MANHOLE FRAMES COVERS

watertight bolted

surface water only

single cover

watertight castings

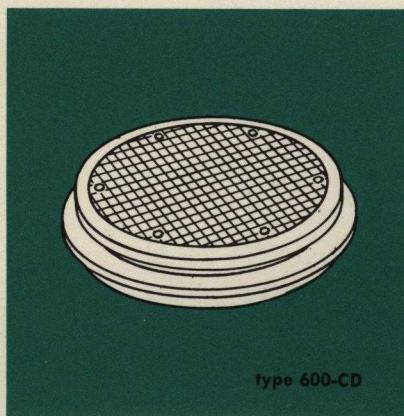
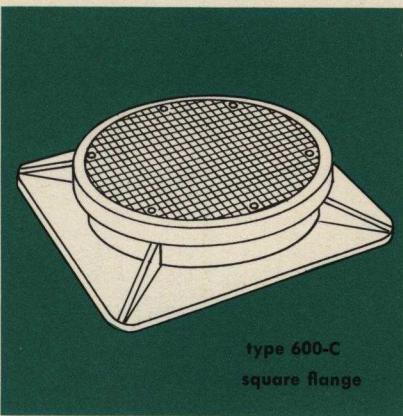
There are basically two types of watertight castings as detailed.

No. 1—bolted and gasketed

No. 2—sealed and locked

Bolted type—only one cover is used and water tightness is attained by the use of Silicon Bronze Cap Screws to compress the gasket.

Sealed and locked type—water tightness is attained by use of an inner cover and the gasket is compressed by the tightening of the lock bar.

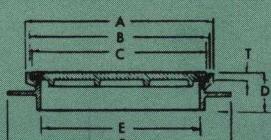
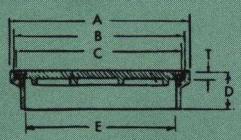
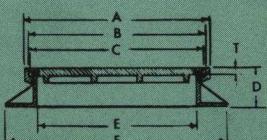


for square watertight castings see page 14

for rectangular watertight castings see pages 14, 15

for hydrostatic and gastight castings see page 9

circular



for pit
type 600-C

circular flange square flange

roadway walkway roadway walkway

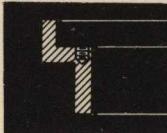
E	A	B	D*	F	C	T	62000	62001	62002	62003	62004	62005	62006	62007	62008	62009
6	12	10	8	20	9 1/8	1 1/4	62000	62001	62002	62003	62004	62005	62006	62007	62008	62009
12	18	16	8	26	15 1/8	1 1/4	62010	62011	62012	62013	62014	62015	62016	62017	62018	62019
18	24	22	8	32	21 1/8	1 1/4	62020	62021	62022	62023	62024	62025	62026	62027	62028	62029
24	30	28	8	38	27 1/8	1 1/4	62030	62031	62032	62033	62034	62035	62036	62037	62038	62039
27	33	31	8	41	30 1/8	1 1/4	62040	62041	62042	62043	62044	62045	62046	62047	62048	62049
30	36	34	8	44	33 1/8	1 1/2	62050	62051	62052	62053	62054	62055	62056	62057	62058	62059
33	39	37	8	47	36 1/8	1 1/2	62060	62061	62062	62063	62064	62065	62066	62067	62068	62069
36	42	40	8	50	39 1/8	1 1/2	62070	62071	62072	62073	62074	62075	62076	62077	62078	62079
40	46	44	8	54	43 1/8	1 1/2	62080	62081	62082	62083	62084	62085	62086	62087	62088	62089
42	48	46	8	56	45 1/8	1 1/2	62090	62091	62092	62093	62094	62095	62096	62097	62098	62099
48	54	52	8	62	51 1/8	1 1/2	62100	62101	62102	62103	62104	62105	62106	62107	62108	62109
54	60	58	8	68	57 1/8	3	62110	62111	62112	62113	62114	62115	62116	62117	62118	62119
60	66	64	8	74	63 1/8	3	62120	62121	62122	62123	62124	62125	62126	62127	62128	62129

* May be varied as desired

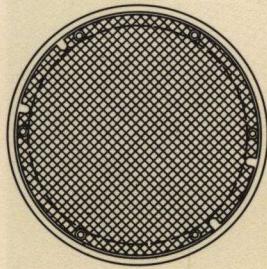
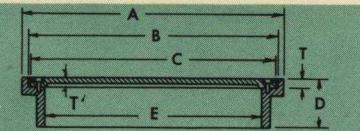
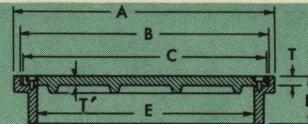
MANHOLE FRAMES COVERS

watertight bolted

circular



1/4-in. flat rubber gasket between milled bearing surfaces; silicon bronze cap screws
T' depends on E
variations: 1, 2, 5, 7, 9, 10, 12, 15,
16, 18, 19 (page 2)
guarantee: ROADWAY types for ten years
ordering: see page 2



E	A	B	C	T	depth, D, in.					depth, D, in.								
					4½	6	8	10	12	4½	6	8	10	12				
type 651-CD																		
ROADWAY																		
4	10	8	7½	1¼	20700	20701	20702	20703	20704	20705	20706	20707	20708	20709				
6	12	10	9¾	1¼	20710	20711	20712	20713	20714	20715	20716	20777	20718	20719				
10	18	14	13¾	1¼	20720	20721	20722	20723	20724	20725	20726	20727	20728	20729				
12	18	16	15¾	1¼	20730	20731	20732	20733	20734	20735	20736	20737	20738	20739				
15	21	19	18¾	1¼	20740	20741	20742	20743	20744	20745	20746	20747	20748	20749				
18	24	22	21¾	1¼	20750	20751	20752	20753	20754	20755	20756	20757	20758	20759				
20	26	24	23¾	1¼	20760	20761	20762	20763	20764	20765	20766	20767	20768	20769				
22	28	26	25¾	1¼	20770	20771	20772	20773	20774	20775	20776	20777	20778	20779				
24	30	28	27¾	1¼	20780	20781	20782	20783	20784	20785	20786	20787	20788	20789				
27	33	31	30¾	1¼	20790	20791	20792	20793	20794	20795	20796	20797	20798	20799				
30	36	34	33¾	1½	20800	20801	20802	20803	20804	20805	20806	20807	20808	20809				
33	39	37	36¾	1½	20810	20811	20812	20813	20814	20815	20816	20817	20818	20819				
36	42	40	39¾	1½	20820	20821	20822	20823	20824	20825	20826	20827	20828	20829				
40	46	44	43¾	1½	20830	20831	20832	20833	20834	20835	20836	20837	20838	20839				
42	48	48	45¾	1½	20840	20841	20842	20843	20844	20845	20846	20847	20848	20849				
45	51	49	48¾	1½	20850	20851	20852	20853	20854	20855	20856	20857	20858	20859				
48	54	52	51¾	1½	20860	20861	20862	20863	20864	20865	20866	20867	20868	20869				
54	60	58	57¾	3	20870	20871	20872	20873	20874	20875	20876	20877	20878	20879				
60	66	64	63¾	3	20880	20881	20882	20883	20884	20885	20886	20887	20888	20889				

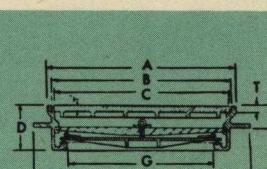
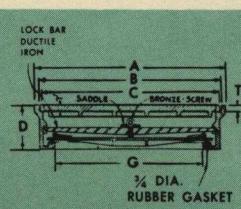
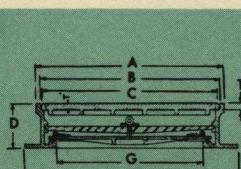
MANHOLE FRAMES COVERS

watertight sealed and locked double cover

circular



3/4-in. diameter rubber gasket; silicon bronze eye bolt; ductile iron locking bar
variations: when specified, both covers may be made in two concentric parts; 1, 3, 4, 5, 6, 9, 13, 14, 15, 16, 18, 19 (page 2)
guarantee: ROADWAY types for 10 years
ordering: see page 2



frame						cover		circular flange		square flange		for pit type 601-A		for slab type 601-RA		for waterproof slab type 601-SA		
G	A	B	D	F	C	T	roadway	walkway	roadway	walkway	roadway	walkway	roadway	walkway	roadway	walkway	roadway	walkway
6	16½	13½	10	23	13	1¼	62300	62301	62302	62303	62304	62305	62306	62307	62308	62309		
12	22½	19½	10	29	19	1¼	62310	62311	62312	62313	62314	62315	62316	62317	62318	62319		
20	30½	27½	10	37	27	1¼	62320	62321	62322	62323	62324	62325	62326	62327	62328	62329		
24	34½	31½	10	40½	31½	1¼	62330	62331	62332	62333	62334	62335	62336	62337	62338	62339		
27	36½	33½	11	43½	33½	1½	62340	62341	62342	62343	62344	62345	62346	62347	62348	62349		
30	39½	36½	11	46½	36½	1½	62350	62351	62352	62353	62354	62355	62356	62357	62358	62359		
31	41½	38½	11	47	38	1½	62360	62361	62362	62363	62364	62365	62366	62367	62368	62369		
36	47	44	10	52½	43½	1½	62370	62371	62372	62373	62374	62375	62376	62377	62378	62379		
40	51	48	10	55½	47½	1½	62380	62381	62382	62383	62384	62385	62386	62387	62388	62389		
42	53	50	10	57½	49½	1½	62390	62391	62392	62393	62394	62395	62396	62397	62398	62399		
48	58	55	10	63	54½	1½	62400	62401	62402	62403	62404	62405	62406	62407	62408	62409		
54	64½	61½	10	68	61	3	62410	62411	62412	62413	62414	62415	62416	62417	62418	62419		
60	70½	67½	10	74	67	3	62420	62421	62422	62423	62424	62425	62426	62427	62428	62429		

MANHOLE FRAMES COVERS

hydrostatic and gas pressure tight
double cover

circular

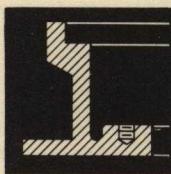
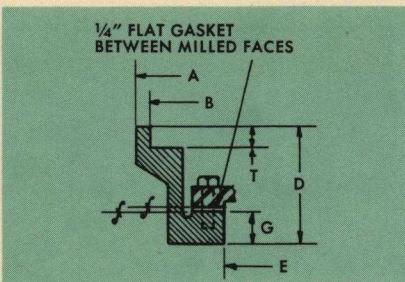
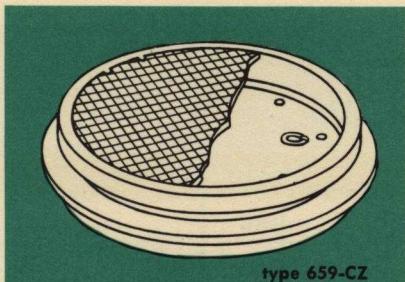
1-in. diameter holes in flange for anchor bolts,
number as required (provision should be made
for anchoring frame flange to structure)

frame: cast iron

variations: 1, 2, 5, 6, 7, 9, 12, 14, 15, 16, 18
(page 2)

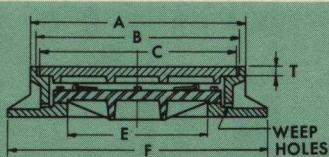
guarantee: ROADWAY types for 10 years

ordering: see page 2



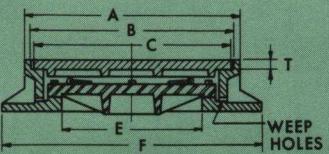
hydrostatic pressure

dimensions based on 250 psi

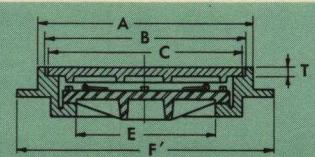


for pit
type 659-CX

E	A	B	C	F	F'	G	T	circular flange		square flange		circular flange		square flange	
								roadway	walkway	roadway	walkway	roadway	walkway	roadway	walkway
18	30	28	27 1/4	34	38	2	1 1/4	22040	22041	22042	22043	22046	22047	22048	22049
21	33	31	30 1/4	37	41	2	1 1/4	22050	22051	22052	22053	22056	22057	22058	22059
24	36	34	33 1/4	40	44	2 1/4	1 1/2	22060	22061	22062	22063	22066	22067	22068	22069
27	39	37	36 1/4	43	47	2 1/4	1 1/2	22070	22071	22072	22073	22076	22077	22078	22079
30	42	40	39 1/4	46	50	2 1/4	1 1/2	22080	22081	22082	22083	22086	22087	22088	22089
33	46	44	43 1/4	50	54	2 1/2	1 1/2	22090	22091	22092	22093	22096	22097	22098	22099
35	48	46	45 1/4	52	56	2 1/2	1 1/2	22100	22101	22102	22103	22106	22107	22108	22109
37	51	49	48 1/4	55	59	2 1/2	1 1/2	22110	22111	22112	22113	22116	22117	22118	22119
40	54	52	51 1/4	58	62	3	2 1/2	22120	22121	22122	22123	22126	22127	22128	22129
46	60	58	57 1/4	64	68	3	2 1/2	22130	22131	22132	22133	22136	22137	22138	22139
52	66	64	63 1/4	70	74	3	2 1/2	22140	22141	22142	22143	22146	22147	22148	22149



for pit
type 659-CZ



for waterproof slab
type 659-CZ

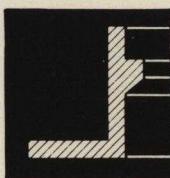
E	A	B	C	F	F'	G	T	circular flange		square flange		circular flange		square flange		roadway	walkway
								roadway	walkway	roadway	walkway	roadway	walkway	roadway	walkway		
18	30	28	27 1/4	34	38	2	1 1/4	36790	36791	36792	36793	36796	36797	36798	36799	36794	36795
21	33	31	30 1/4	37	41	2	1 1/4	36800	36801	36802	36803	36806	36807	36808	36809	36804	36805
24	36	34	33 1/4	40	44	2 1/4	1 1/2	36810	36811	36812	36813	36816	36817	36818	36819	36814	36815
27	39	37	36 1/4	43	47	2 1/4	1 1/2	36820	36821	36822	36823	36826	36827	36828	36829	36824	36825
30	42	40	39 1/4	46	50	2 1/4	1 1/2	36830	36831	36832	36833	36836	36837	36838	36839	36834	36835
33	46	44	43 1/4	50	54	2 1/2	1 1/2	36840	36841	36842	36843	36846	36847	36848	36849	36844	36845
35	48	46	45 1/4	52	56	2 1/2	1 1/2	36850	36851	36852	36853	36856	36857	36858	36859	36854	36855
37	51	49	48 1/4	55	59	2 1/2	1 1/2	36860	36861	36862	36863	36866	36867	36868	36869	36864	36865
40	54	52	51 1/4	58	62	3	2 1/2	36870	36871	36872	36873	36876	36877	36878	36879	36874	36875
46	60	58	57 1/4	64	68	3	2 1/2	36880	36881	36882	36883	36886	36887	36888	36889	36884	36885
52	66	64	63 1/4	70	74	3	2 1/2	36890	36891	36892	36893	36896	36897	36898	36899	36894	36895

▲ both covers: E 40 in. and smaller, cast iron; E over 40 in., ductile iron

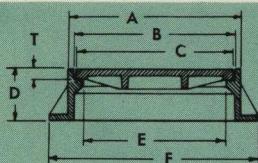
MANHOLE FRAMES COVERS

standard

■ square • for pit construction

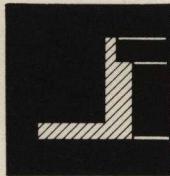


depth of casting and flange dimensions may be varied as desired; lock operated if specified
variations: 1, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16 (page 2)
ordering: see page 2

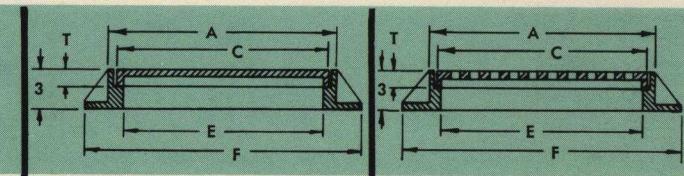


frame						cover		frame						cover	
E	D	F	A	B	C	T		E	D	F	A	B	C	T	
ROADWAY type 290-D with cover															
6	5	14	9 1/4	8	7 3/4	1	26930	24	6	33	27 3/4	26	25 3/4	1 1/4	35108
8 1/2	5	13 3/4	11 1/4	10 1/4	10	2 5/8	37885	24	8	35	27 1/2	26	25 3/4	1 1/2	26393
9 1/2	9 5/8	21 1/2	12 1/2	11 1/2	11 1/4	3	25406	26	10	36	29	27 1/2	27 1/4	3	35800
11 1/2	9	20	14	13 1/4	13	2 1/2	25404	27 1/2	11 1/2	40	32	30	29 1/2	1 1/8	25597
16	5	26	19 1/2	18	17 3/4	1 1/4	29655	30	6 1/4	41	33 3/4	32 1/4	32	2	39635
18	6	28	21 1/4	20	19 1/4	2	33916	32	4	44	36	34 1/4	34	1	28238
18	8	32	21 1/4	20	19 3/4	2	34968	34	7	44	37 3/4	36	35 3/4	1 1/2	35726
21 1/4	8	36	25 3/4	24	23 3/4	1 1/2	29595	34	8 1/2	46	38 3/4	36 1/4	36	1 1/4	26338
22	4 1/2	33 1/2	26 1/4	24 1/4	24	1 3/4	29679	36	7	46	40	38	37 3/4	1 1/2	20303
22	5	32 1/4	26 3/4	24 1/4	24	1 3/4	23994	36	8	48	40	38	37 3/4	1 1/2	39636
22	6	36	27	24 1/4	24	1 3/8	34921	40	5	50	44	42	41 1/4	1 1/2	18706
22	8	40	27	24 1/4	24	1 3/4	25914	42	5	52	46	44	43 3/4	1 1/2	18707
23	4	36 1/4	25 1/4	24 1/4	24	1 1/4	30411	48	5	57	52	50	49 3/8	1 1/2	26021
24	6	28	21 1/4	20	19 3/4	2	33679	48	8	58	52	50	49 3/4	1 1/2	39367

■ square • for pit construction



depth of casting and flange dimensions may be varied as desired.
variations: 1, 3, 4, 5, 6, 15, 16, 18, 19 (page 2)
ordering: see page 2

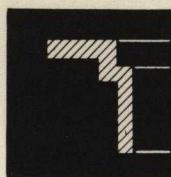


E	A	F	C	T			
WALKWAY type 619-E							
6	8 1/2	12	7 1/4	1 1/4		61201	
8	10 1/2	14	9 1/4	1 1/4		61203	
10	12 1/2	16	11 1/4	1 1/2		61205	
12	14 1/2	18	13 1/4	1 1/2		61207	
14	16 1/2	20	15 1/4	1 1/2		61209	
16	18 1/2	22	17 1/4	1 1/2		61211	
18	20 1/2	24	19 1/4	1 1/2		61213	
20	22 1/2	26	21 1/4	1 1/2		61215	
22	24 1/2	28	23 1/4	1 1/2		61217	
24	26 1/2	30	25 1/4	1 1/2		61219	
26	29	32	27 1/4	1 1/2		61221	
28	31	34	29 1/4	1 1/2		61223	
30	33	36	31 1/4	1 1/2		61225	
32	35	38	33 1/4	1 1/2		61227	
34	37	40	35 1/4	1 1/2		61229	
36	39	42	37 1/4	1 1/2		61231	
42	45	48	43 1/4	1 1/2		61233	
48	51	54	49 1/4	1 1/2		61235	
54	57	60	55 1/4	1 1/2		61237	
60	63	66	61 1/4	1 1/2		61239	
66	69	72	67 1/4	1 1/2		61241	
72	75	78	73 1/4	1 1/2		61243	

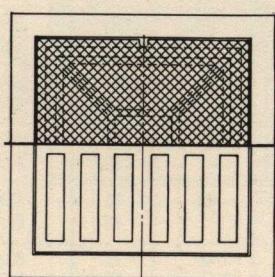
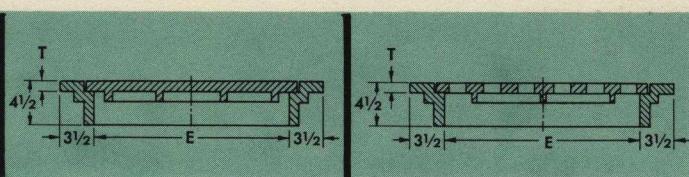
MANHOLE FRAMES COVERS

standard

■ square • for slab construction



depth of casting may be varied as desired
variations: 1, 3, 4, 5, 6, 9, 10, 15, 16
(page 2)
ordering: see page 2



clear opening

E | T

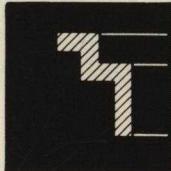
ROADWAY type 613-H

6	1	61894	61895
12	1	61880	61887
16	1	61881	61888
20	1	61882	61889
24	1½	61883	61890
27	1½	61896	61897
30	1½	61884	61891
36	1½	61885	61892
42	2½	61886	61893
48	3	61898	61899

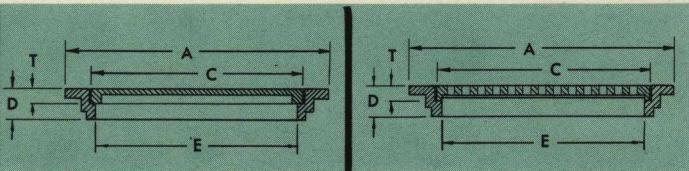
with cover

with plane grating

■ square • for slab construction



depth of casting and flange dimensions
may be varied as desired.
variations: 1, 3, 4, 5, 6, 7, 8, 15, 16, 18,
19 (page 2)
ordering: see page 2



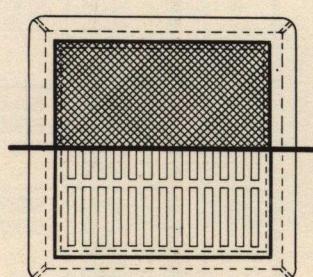
E | A | D | C | T

WALKWAY type 622-H

6	12	3	7½	1¼	61351	61350
8	14	3	9¼	1¼	61353	61352
10	16	3	11½	1½	61355	61354
12	18	3	13½	1½	61357	61356
14	20	3	15½	1½	61359	61358
16	22	3	17½	1½	61361	61360
18	24	3	19½	1½	61363	61362
20	26	3	21½	1½	61365	61364
22	28	3	23½	1½	61367	61366
24	30	3	25½	1½	61369	61368
26	32	3	27½	1½	61371	61370
28	34	3	29½	1½	61373	61372
30	36	3	31½	1½	61375	61374
32	38	3	33½	1½	61377	61376
34	40	3	35½	1½	61379	61378
36	42	3	37½	1½	61381	61380
42	48	3	43½	1½	61383	61382
48	54	3	49½	1½	61385	61384
54	60	4	55½	1½	61387	61386
60	66	4	61½	1½	61389	61388
66	72	4	67½	1½	61391	61390
72	78	4	73½	1½	61393	61392

with cover

with plane grating



*May be varied as desired.

MANHOLE FRAMES COVERS

standard

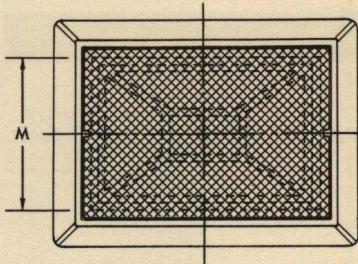
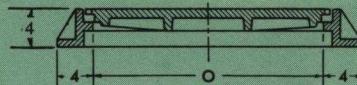
rectangular • for pit construction



depth of casting and flange dimensions may be varied as desired; cover dimensions are 2 in. longer than dimensions M and O

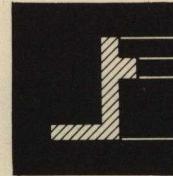
varyations: 1, 3, 4, 5, 6, 15, 16, 18, 19
(page 2)

guarantee: ten years
ordering: see page 2



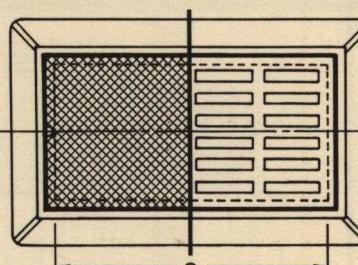
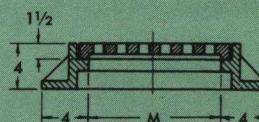
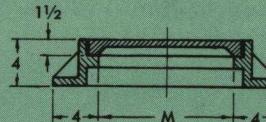
clear opening		clear opening		clear opening	
M	O	M	O	M	O
ROADWAY type 610-E with cover					
10	15 20	60700 60701	24	36 48	60714 60715
12	18 24	60702 60703	26	39 52	60716 60717
14	21 28	60704 60705	28	42 56	60718 60719
16	24 32	60706 60707	30	45 60	60720 60721
18	27 36	60708 60709	32	48 64	60722 60723
20	30 40	60710 60711	34	51 68	60724 60725
22	33 44	60712 60713	36	54 72	60726 60727

rectangular • for pit construction



depth of casting and flange dimensions may be varied as desired; lock operated when specified

varyiations: 1, 3, 4, 5, 6, 7,
8, 9, 10, 11, 15, 16 (page 2)
ordering: see page 2



M	O	cover	grating	M	O	cover	grating	M	O	cover	grating
WALKWAY type 620-E with cover or plane grating											
10	15 20 30 40	61250 61270 22900 22902	62950 62970	24	36 48 72 96	61257 61277 22928 22930	62957 62977	38	57 76 114 152	61264 61284 22956 22958	62964 62984
12	18 24 36 48	61251 61271 22904 22906	62951 62971	26	39 52 78 104	61258 61278 22932 22934	62958 62978	40	60 80 120 160	61265 61285 22960 22962	62965 62985
14	21 28 42 56	61252 61272 22908 22910	62952 62972	28	42 56 84 112	61259 61279 22936 22938	62959 62979	42	63 80 126 160	61266 61286 22964 22966	62966 62986
16	24 32 48 64	61253 61273 22912 22914	62953 62973	30	45 60 90 120	61260 61280 22940 22942	62960 62980	44	66 80 132 160	61267 61287 22968 22970	62967 62987
18	27 36 54 72	61254 61274 22916 22918	62954 62974	32	48 64 96 128	61261 61281 22944 22946	62961 62981	46	69 80 138 160	61268 61288 22972 22974	62968 62988
20	30 40 60 80	61255 61275 22920 22922	62955 62975	34	51 68 102 136	61262 61282 22948 22950	62962 62982	48	72 80 144 160	61269 61289 22976 22978	62969 62989
22	33 44 66 88	61256 61276 22924 22926	62956 62976	36	54 72 108 144	61263 61283 22952 22954	62963 62983				



MANHOLE FRAMES COVERS standard

rectangular • for slab construction

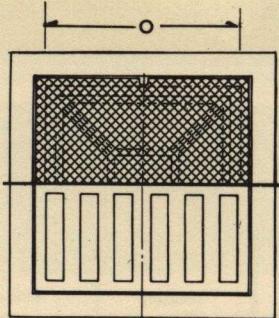
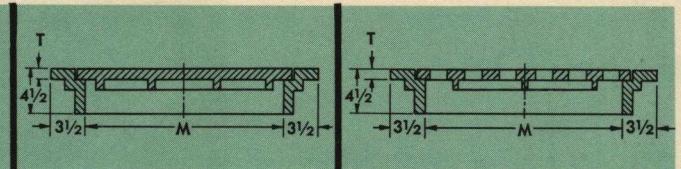


depth of casting and flange dimensions may be varied as desired; cover dimensions are 2 in. longer than dimensions M and O

variations: 1, 3, 4, 5, 6, 7, 8, 15, 16, 18, 19 (page 2)

guarantee: ten years

ordering: see page 2



clear opening
M O T

ROADWAY type 613-H

			with cover	with plane grating
12	18 24	1 1	60800 60801	60812 60813
16	24 32	1 1	60802 60803	60814 60815
20	30 40	1 1/4 1 1/4	60804 60805	60816 60817
24	36 48	1 1/4 1 1/4	60806 60807	60818 60819
30	45 60	1 1/2 1 1/2	60808 60809	60820 60821
36	54 72	1 1/2 1 1/2	60810 60811	60822 60823

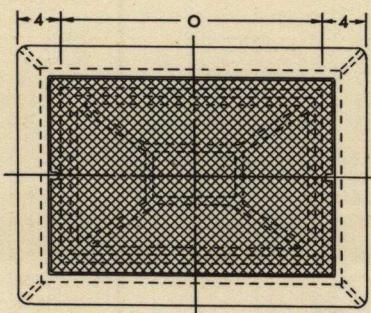
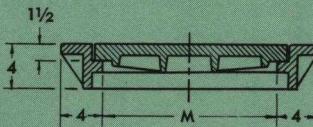
rectangular • for slab construction



variations: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 16, 18 (page 2)

ordering: see page 2

depth of casting may be varied as desired



clear opening
M O clear opening
M O

WALKWAY type 623-P with cover

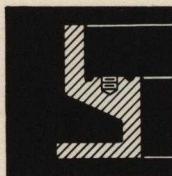
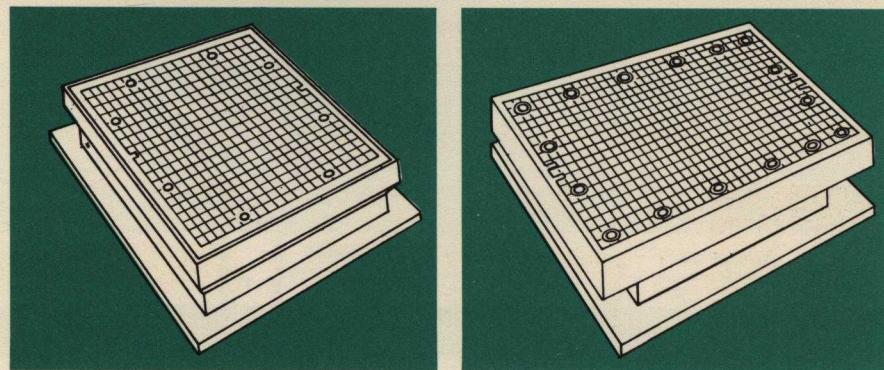
10	15 20	60830 60831	30	45 60	60850 60851
12	18 24	60832 60833	32	48 64	60852 60853
14	21 28	60834 60835	34	51 68	60854 60855
16	24 32	60836 60837	36	54 72	60856 60857
18	27 36	60838 60839	38	57 76	60858 60859
20	30 40	60840 60841	40	60 80	60860 60861
22	33 44	60842 60843	42	63 80	60862 60863
24	36 48	60844 60845	44	66 80	60864 60865
26	39 52	60846 60847	46	69 80	60866 60867
28	42 56	60848 60849	48	72 80	60868 60869

MANHOLE FRAMES COVERS

watertight

surface water only
single cover

■ square



$\frac{3}{4}$ -in. diameter rubber gasket; silicon bronze cap screw

varyations: 1, 2, 3, 4, 5, 7,
9, 15, 16, 18, 19 (page 2)

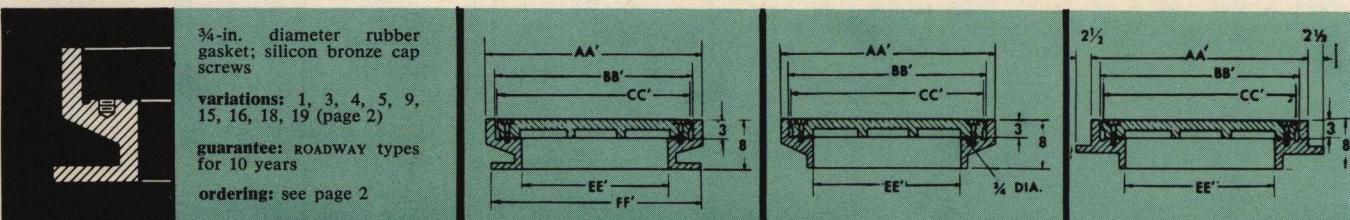
guarantee: ROADWAY types
for 10 years

ordering: see page 2

E	A	B	C	F'	F	D•	T	roadway	walkway	roadway	walkway	roadway	walkway
for pit type 640-C													
6	15	13	12 $\frac{3}{4}$	20	16	8	3	24900	24901	24902	24903	24904	24905
12	21	19	18 $\frac{3}{4}$	26	22	8	3	24906	24907	24908	24909	24910	24911
18	27	25	24 $\frac{3}{4}$	32	28	8	3	24912	24913	24914	24915	24916	24917
20	29	27	26 $\frac{3}{4}$	34	30	8	3	24918	24919	24920	24921	24922	24923
24	33	31	30 $\frac{3}{4}$	38	34	8	3	24924	24925	24926	24927	24928	24929
27	36	34	33 $\frac{3}{4}$	41	37	8	3	24930	24931	24932	24933	24934	24935
30	39	37	36 $\frac{3}{4}$	44	40	8	3	24936	24937	24938	24939	24940	24941
33	42	40	39 $\frac{3}{4}$	47	43	8	3	24942	24943	24944	24945	24946	24947
36	45	43	42 $\frac{3}{4}$	50	46	8	3	24948	24949	24950	24951	24952	24953
42	51	49	48 $\frac{3}{4}$	56	52	8	3	24954	24955	24956	24957	24958	24959
48	57	55	54 $\frac{3}{4}$	62	58	8	3	24960	24961	24962	24963	24964	24965
54	63	61	60 $\frac{3}{4}$	68	64	8	3	24966	24967	24968	24969	24970	24971
60	69	67	66 $\frac{3}{4}$	74	70	8	3	24972	24973	24974	24975	24976	24977

* May be varied as desired ■ Refers to type 640-SR only

■ rectangular



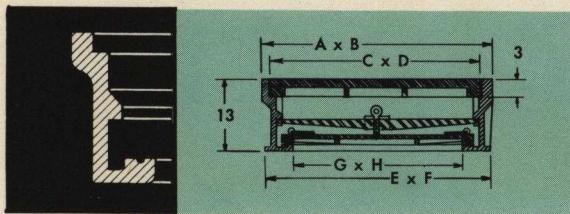
E	E'	A	A'	B	B'	C	C'	F	F'	roadway	walkway	roadway	walkway	roadway	walkway
for pit type 656-C															
6	12	15	21	13	19	12 $\frac{3}{4}$	18 $\frac{3}{4}$	16	22	22600	22601	22602	22603	22604	22605
12	24	21	33	19	31	18 $\frac{3}{4}$	30 $\frac{3}{4}$	22	34	22606	22607	22608	22609	22610	22611
18	36	27	45	25	43	24 $\frac{3}{4}$	42 $\frac{3}{4}$	28	46	22612	22613	22614	22615	22616	22617
20	40	29	49	27	47	26 $\frac{3}{4}$	46 $\frac{3}{4}$	30	50	22618	22619	22620	22621	22622	22623
24	48	33	57	31	55	30 $\frac{3}{4}$	54 $\frac{3}{4}$	34	58	22624	22625	22626	22627	22628	22629
27	54	36	63	34	61	33 $\frac{3}{4}$	60 $\frac{3}{4}$	37	64	22630	22631	22632	22633	22634	22635
30	60	39	69	37	67	36 $\frac{3}{4}$	66 $\frac{3}{4}$	40	70	22636	22637	22638	22639	22640	22641
33	66	42	75	40	73	39 $\frac{3}{4}$	72 $\frac{3}{4}$	43	76	22642	22643	22644	22645	22646	22647
36	72	45	81	43	79	42 $\frac{3}{4}$	78 $\frac{3}{4}$	46	82	22648	22649	22650	22651	22652	22653
40	80	49	89	47	87	46 $\frac{3}{4}$	86 $\frac{3}{4}$	50	90	22654	22655	22656	22657	22658	22659
42	84	51	93	49	91	48 $\frac{3}{4}$	90 $\frac{3}{4}$	52	94	22660	22661	22662	22663	22664	22665
48	96	57	105	55	103	54 $\frac{3}{4}$	102 $\frac{3}{4}$	58	106	22666	22667	22668	22669	22670	22671
54	108	63	117	61	115	60 $\frac{3}{4}$	114 $\frac{3}{4}$	64	118	22672	22673	22674	22675	22676	22677
60	120	69	129	67	127	66 $\frac{3}{4}$	126 $\frac{3}{4}$	70	130	22678	22679	22680	22681	22682	22683

MANHOLE FRAMES COVERS

watertight

surface water only
sealed and locked double cover

■ rectangular • for pit construction



3/4-in. diameter rubber gasket; silicon bronze eye bolts;
ductile iron locking bar

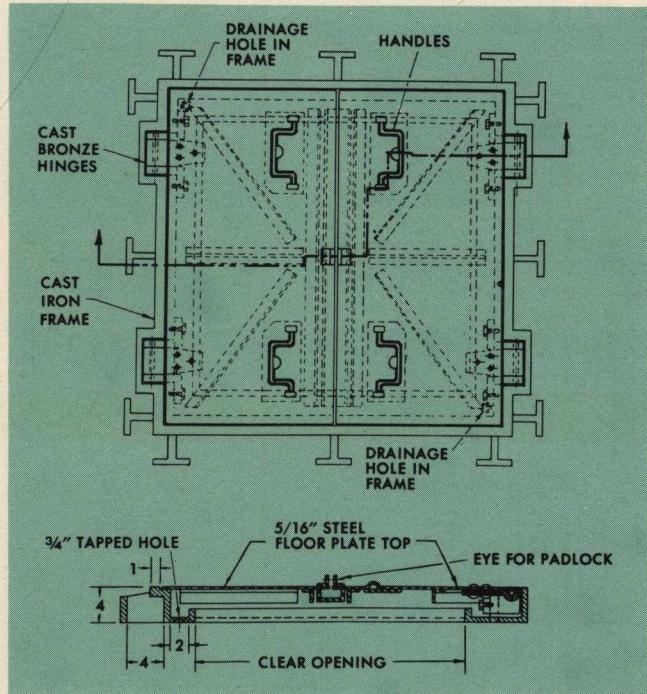
variations: 1, 2, 3, 4, 5, 7, 9, 15, 16, 18, 19 (page 2)

guarantee: ROADWAY types for 10 years

ordering: see page 2

opening, in.		A	B	E	F	C	D	roadway	walkway
G	H	type 641 with cover							
6	9	17	20	16	19	13 3/4	16 1/4	24500	24501
12	18	23	29	22	28	19 3/4	25 1/4	24506	24507
18	27	29	38	28	37	25 1/4	34 1/4	24512	24513
20	30	31	41	30	40	27 3/4	37 1/4	24518	24519
24	36	35	47	34	46	31 1/4	43 1/4	24524	24525
27	40 1/2	38	51 1/2	37	50 1/2	34 1/4	48 1/4	24530	24531
30	45	41	56	40	55	37 3/4	52 1/4	24536	24537
33	49 1/2	44	60 1/2	43	59 1/2	40 1/4	57 1/4	24542	24543
36	54	47	65	46	64	43 1/8	61 1/8	24548	24549
40	60	51	71	50	70	47 1/8	67 1/8	24554	24555
42	63	53	74	52	73	49 1/8	70 1/8	24560	24561
48	72	59	83	58	82	55 1/8	79 1/8	24566	24567
54	81	65	92	64	91	61 1/8	88 1/8	24572	24573
60	90	71	101	70	100	67 1/8	97 1/8	24578	24579

■ square or ■ rectangular



variations: provision for internal lock; special sizes as required; ROADWAY installation data on request

ordering: specify both type number (670) and code number (from table); state number of door panels required and sides on which hinges are located; state variations, if any, required

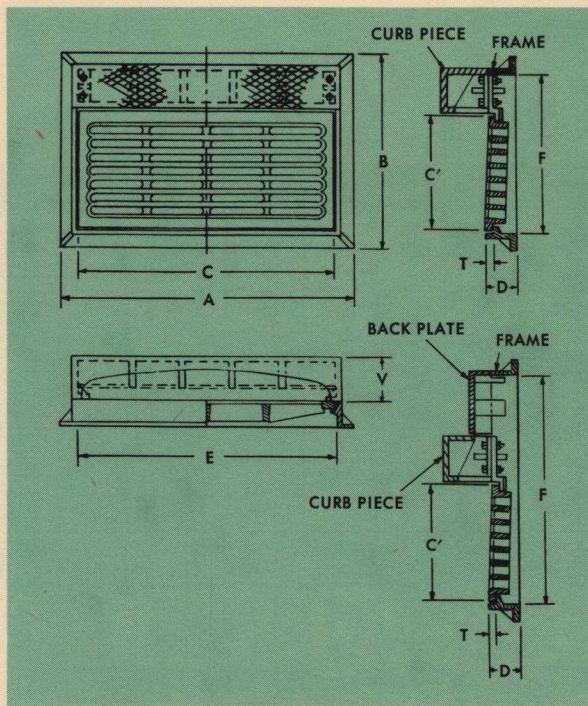
opening, in.		plate cover		opening, in.		plate cover	
		steel	aluminum			steel	aluminum
WALKWAY type 670 with hinged plate covers							
24	24	33650	16500	54	54	33665	16515
	36	33651	16501		81	33666	16516
	48	33652	16502		108	33667	16517
30	30	33653	16503	60	60	33668	16518
	45	33654	16504		90	33669	16519
	60	33655	16505		120	33670	16520
36	36	33656	16506	66	66	33671	16521
	54	33657	16507		99	33672	16522
	72	33658	16508		132	33673	16523
42	42	33659	16509	72	72	33674	16524
	63	33660	16510		108	33675	16525
	84	33661	16511		144	33676	16526
48	48	33662	16512				
	72	33663	16513				
	96	33664	16514				

CATCH BASIN FRAMES GRATINGS

curb, standard

curb

plane grating



dimension V generally 2 in. greater than adjacent curb depth—but may be varied as required

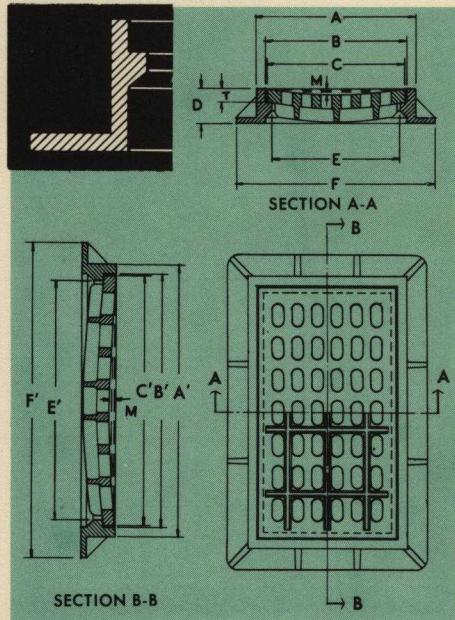
curb inlet with circular base also available

guarantee: ten years

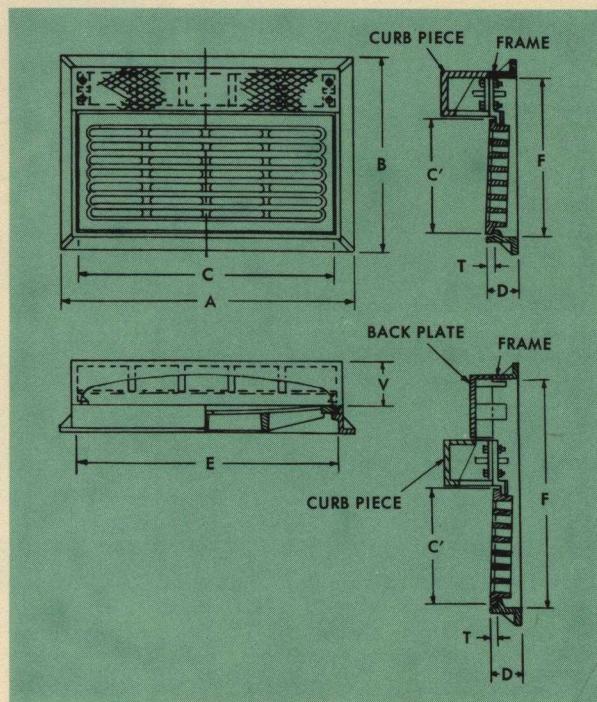
ordering: specify both type number (683), curb height, V, and code number (from table)

standard

rectangular



concave grating



frame		grating					area grate opening sq. in.	code no. plane grating	code no. concave grating
E	F	A	B	D	C	C'	T		
ROADWAY type 683 without back plate									
30	30	36	36	5½	29¾	21¾	1¼	210	60280 60288
36	27½	36	35¾	6½	35	21¾	1¼	240	60281 60289
48	29	54	37	6½	47¾	21¾	1¼	400	60282 60290
49	36	55½	42¾	5	49½	29¾	1	630	60283 60291
48	50	54	56	5	47¾	43½	1¼	800▲	60284 60292

ROADWAY type 683 with back plate									
25½	27½	37	39½	6½	24	18¾	2½	145	60285 60293
36	34¾	43	43	6½	35	21¾	1¼	240	60286 60294
48	42	54	48	6½	47¾	21¾	1¼	400	60287 60295

▲ grating in two parts

frame												grating			size openings	no. openings	total open area	code no.
E	E'	D	F	F'	A	A'	B	B'	C	C'	T	M						
ROADWAY Type 339-D with concave grating																		
12½	17½	4	20	x25	15¾	x20¾	14¾	x19	14	x18¾	1½	%	1½" x1¾"	18	31	38458		
14	26	6½	23¾	x35¾	17½	x29½	16	x28	15¾	x27¾	2	¾	1⅓" x3½"	24	139	29483		
17	22½	4½	27	x32½	20¾	x26	19¾	x24½	18¾	x24	2	½	1⅓" x3¾"	30	249	29417		
19	32	4	28	x41¾	22½	x35¾	20¾	x34¾	20½	x34¾	2¾	¾	2" x3½"	42	258	35194		
19	35	5½	30½	x46½	24½	x40½	21½	x37½	21	x37½	2	1	1⅓" x3½"	42	233	29480		
19	45	5	28	x54	23½	x49½	22	x48	21½	x47½	1¼	1¼	2" x3"	60	308	25101		
19	45	5	28	x54	23½	x49½	22	x48	21½	x47½	3	1¼	2" x3"	60	308	22516		
19½	33½	5	28	x42	23½	x37½	22	x36	21½	x35¾	1¼	¾	2" x4½"	36	274	21686		
19½	36	5	30½	x46½	24½	x40½	21½	x38½	21½	x38	2	¾	1⅓" x3¾"	49	280	26118		
20	34	5½	28	x42	23½	x37½	22	x36	21½	x35½	1¼	¾	2" x4½"	36	274	20246		
21	27	3	27½	x34	25½	x31¾	23	x29½	22½	x29½	2	1	2" x3"	26447				
24	34	4½	32	x42½	28½	x38½	26½	x36½	26½	x36	3	1¼	2" x3½"	49	219	26219		
27	46½	5	36	x55½	32	x51½	30	x49½	29½	x49½	3	1½	1⅓" x3½"	80	370	22517		
27	47	5	36	x55½	32	x51½	30	x49½	29½	x49	1	1½	1⅓" x3½"	80	370	25115		
33	39	5	43	x49	36¾	x43¾	35½	x42½	35	x42	1¼	1⅓	1⅓" x3½"	42	222	26117		
42½	45	5	49½	x54	45½	x49½	44	x48	43½	x47¾	1¼	2"	2" x3½"	120	736	26119		

CATCH BASIN TRAPS

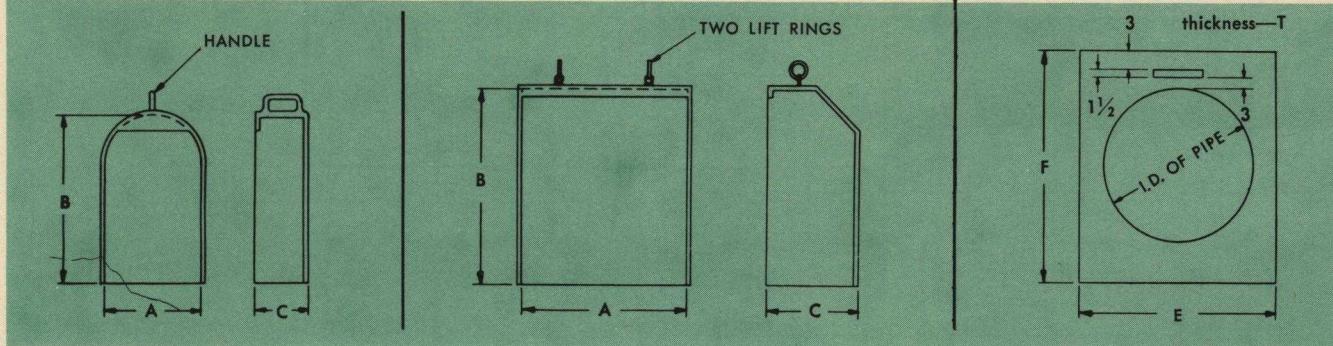
standard, gas tight

standard

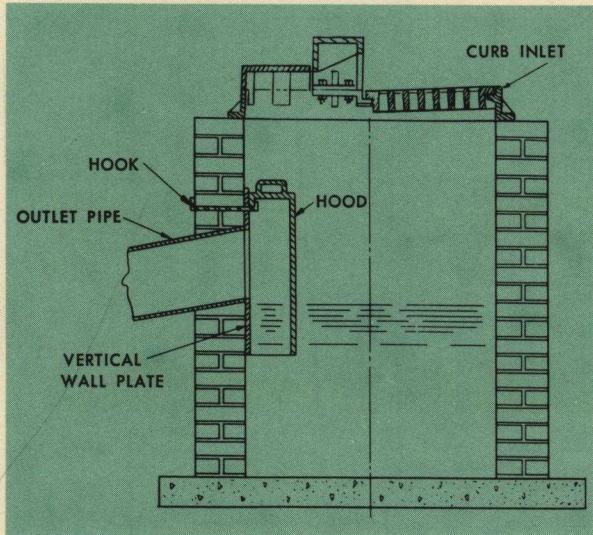
hood detail

for pipe sizes to 20 in.

for pipe sizes 22 in. and over

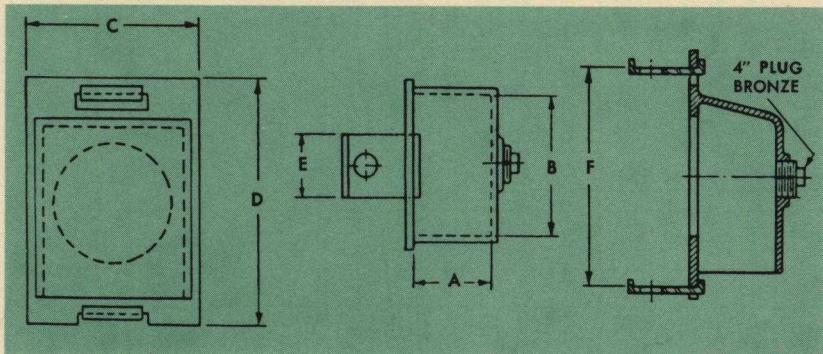


installation of trap with curb inlet



pipe size	hood			vertical wall plate			code no.	
	A	B	C	E	F	T	with vertical plate	without vertical plate
type 1168								
4	6	12	3	8	15	5/8	30133	30134
6	8 1/2	15	4	10 1/2	20	5/8	19706	19707
8	11 1/2	20 1/2	5 1/2	13 1/2	23 1/2	5/8	26714	26721
10	13 1/4	23 1/2	6 1/2	15 1/4	26 1/2	5/8	26715	26722
12	15 3/4	26	7 1/2	17 3/4	29	5/8	26716	26723
15	18	27	9	20	30	3/4	26717	26724
18	21 1/4	27 1/4	12 3/4	23 1/2	32 1/4	7/8	19708	19709
20	25 1/4	29 1/4	14 3/4	27 1/4	32 1/4	7/8	26719	26726
22	26 3/4	31 1/4	15	29	36 3/4	7/8	19710	19711
24	30 1/2	33 3/4	15	32 1/4	36 3/4	7/8	19697	21628
27	30 1/2	36 1/4	19 1/4	33	42 1/4	1	19712	19713
30	35	39 1/4	21	37	42 1/4	1	19701	22998
33	40 1/2	42 1/4	22	43	47 1/4	1	19714	19715
36	50	44 1/4	21 1/8	52	47 1/4	1	19702	22999

gas tight

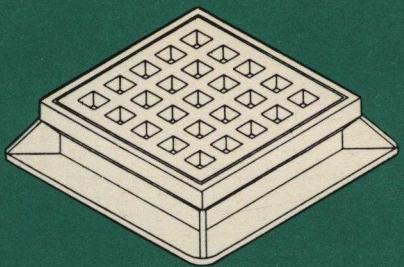


ordering: see page 2

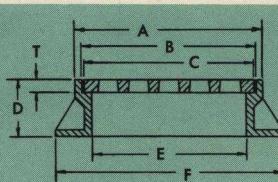
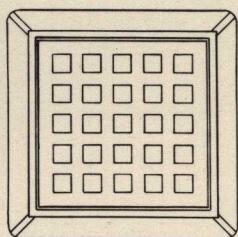
pipe size	A	B	C	D	E	F	code no.
type 520							
4	3	6	10	20	6	16 1/2	38100
6	4	9	13	22	6	18 1/2	38101
8	5	12	16	24	8	20 1/2	38102
10	6	14	18	26	8	22 1/2	38103
12	8	16	20	28	8	24 1/2	38104
15	10	18	22	31	8	27 1/2	38105
18	12	24	29	34	10	30 1/2	38106
21	12	30	35	37	10	33 1/2	38107
24	15	32	37	40	12	36 1/2	38108
27	15	40	45	43	12	39 1/2	38109
30	15	48	54	46	12	42 1/2	38110

INLET FRAMES GRATINGS

standard



■ square

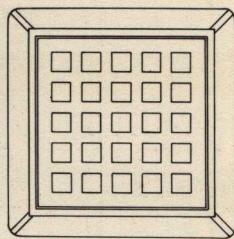
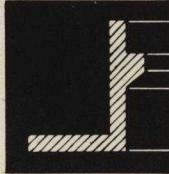


guarantee: ten years

ordering: see page 2

frame	E	D	F	A	B	grating		openings		code no.
						C	T	no.	size	
ROADWAY type 309-C plane grating										
16	10	26	20	18	17½ 19½	1½ 1½		12	1½ x 6¾ 1 x 7½	20200
18	6	26	20½	19½				20		19084
20	8	30	25	22	21¾	1½		..	..	19923
24	6	34	29¼	26¼	26	1½		36	2½ x 2½	19906
8	34	29¼	26¼	26	26	1½		36	2½ x 2½	19907
10	40¼	29¼	26¼	26	26	1½		36	2½ x 2½	28200
26	10	36½	31	28	27¾	1½		27	1½ x 6¾	20202
30	6	40½	35	32	31¾	1½		..	..	19924
8	40½	35	32	32	31¾	1½		..	..	19925
10	40½	35	32	32	31¾	1½		..	..	28202
36	6	46½	41	38	37¾	1½		49	¾ x ¾	19910
8	46½	41	38	38	37¾	1½		49	¾ x ¾	19911
10	46½	41	38	38	37¾	1½		49	¾ x ¾	28204
42	6	52½	47	44	43¾	1½		..	..	19914
8	52½	47	44	44	43¾	1½		..	..	19915
10	52½	47	44	44	43¾	1½		..	..	28206
48	6	58½	53	50	49¾	1½		..	..	19918
8	58½	53	50	50	49¾	1½		..	..	19919
10	58½	53	50	50	49¾	1½		..	..	28208
54	6	64½	59	56	55¾	1½		..	..	19920
8	64½	59	56	56	55¾	1½		..	..	19921
10	64½	59	56	56	55¾	1½		..	..	28209

■ square

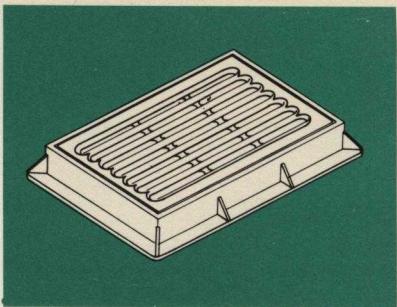


frame	E	D	F	A	B	grating		openings			code no.
						C	T	no.	size	area	
ROADWAY type 310-D plane grating											
9½	5	21½	12¼	11½	11¼	3		9	2 x 2	36	19430
10	4	20	13½	12½	12	1		36	1 x 1	36	25986
11½	4	20	15	13¾	13½	1		12	1¾ x 5½	77	25975
16	6¾	26	19½	18	17¾	1½		25	2 x 2	100	22580
	4	27	19¾	18¾	18	1¼		64	1 x 1	64	29180
18	8	32	21¾	20	19¾	2		64	1¾ x 1¾	121	21593
22	4	32½	26¾	24½	24	¾		36	2¾ x 2¾	203	19334
	5	32½	26¾	24½	24	¾		36	2¾ x 2¾	203	31392
	8	32½	26¾	24½	24	¾		36	2¾ x 2¾	203	19333
	8¾	36	25¾	24½	24	¾		21	1¾ x 5¾	216	27527
	8	40½	26¾	24½	24	¾		25	2¾ x 2¾	207	25414
24	6	33	27¾	26½	26	¼		36	2½ x 2½	163	33952
	8	35	27½	26	25¾	½		36	2½ x 2½	163	30889
26½	7	37	30	29	28½	2		64	2 x 2	256	22585
30	6¼	41	33¾	32½	32	2		27	2 x 8	432	39626
32	4	44	36	34½	34	½		49	¾ x 3¼	518	25471
34	6	44	38	36	35¾	3		49	¾ x 3¼	518	39629
36	8	48	40	38	37¾	½		49	¾ x 3¼	518	39634

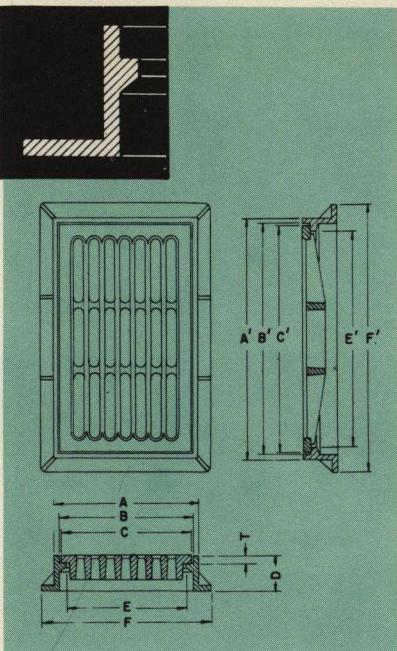
guarantee: ten years

ordering: see page 2

INLET FRAMES GRATINGS standard



rectangular



guarantee: ten years
ordering: see page 2

frame										grating				openings			code no.
E	E'	D	F	F'	A	A'	B	B'	C	C'	T	no.	size	area			
ROADWAY type 325-D																	
10	21	5	20	31	14	25	12	23	11 1/4	22 1/4	1 1/2	8	1 1/8 x 9 3/8	100	39659		
10	45 1/4	5	20	53 1/4	14	47 1/4	12	45 1/4	11 1/4	45 1/2	1 1/2	16	1 1/8 x 9 3/8	200	22547		
15 1/4	45 1/4	3 1/2	22 3/4	28 1/4	20 1/4	50 1/4	18 1/4	48 1/4	18	48	2 1/4	24	1 1/2 x 10 5/8	370	22548		
15 1/4	21 1/4	3 1/4	22 3/4	28 1/4	20 1/4	26 1/4	18 1/4	24 1/4	18	24	2 1/4	24	1 1/2 x 10 5/8	185	32392		
17 1/4	21	4	23 3/4	30 1/2	20 3/4	24 1/2	19 1/4	23	19	22 1/4	1 1/8	14	1 1/2 x 9 3/8	190	34965		
17 1/4	43 3/4	4	23 3/4	53 1/4	20 3/4	47 1/4	19 1/4	45 1/4	19	45 1/2	1 1/8	28	1 1/2 x 9 3/8	380	22409		
18 1/2	32 1/8	4	28	41 1/2	22 1/4	36 1/8	20 3/4	34 1/8	20 1/2	34 1/8	1 1/4	24	1 1/8 x 9	236	21362		
18 1/2	66 1/4	4	28	75 1/8	22 1/4	70 1/2	20 3/4	68 1/2	20 1/2	68 1/4	1 1/4	48	1 1/8 x 9	472	22424		
19 1/4	32 1/4	4	28	41 1/8	22 1/4	35 1/8	21	34 1/8	20 3/4	33 1/8	1 1/4	24	1 1/8 x 9	236	21627		
19 1/4	66 1/8	4	28	75 1/4	22 1/4	69 1/2	21	68	20 3/4	67 1/4	1 1/4	48	1 1/8 x 9	472	22428		
19 1/2	36	5	30 1/2	46 1/4	23 3/8	39 1/8	21 1/8	38 1/4	21 1/8	38	2	21	1 1/2 x 11 1/4	344	30205		
19 1/2	74	5	30 1/2	84 1/4	23 3/8	77 1/8	21 1/8	76 1/4	21 1/8	76	2	42	1 1/2 x 11 1/4	688	22433		
19 1/2	33 1/2	5	28	42	23 1/2	37 1/2	22	36	21 1/4	35 1/4	1 1/4	21	1 1/2 x 9	273	32316		
19 1/2	69 1/4	5	28	77 1/4	23 1/2	73 1/4	22	71 1/4	21 1/4	71 1/2	1 1/4	42	1 1/2 x 9	546	22549		
19 1/2	45	5	28	54	23 1/2	49 1/2	22	48	21 1/4	47 1/2	1 1/4	28	1 1/2 x 10	406	32315		
19 1/2	92 1/2	5	28	101 1/2	23 1/2	97	22	95 1/2	21 1/4	95	1 1/4	56	1 1/2 x 10	812	22550		
21 1/4	21	5	31 1/4	31	25 1/4	25	23 1/4	23	23 1/2	22 1/2	1 1/2	16	1 1/8 x 9 3/8	200	22438		
22	26	5	32	36	26	30	24	28	23 1/4	27 1/4	1 1/8	16	1 1/2 x 11 1/8	271	22546		
22	53 3/4	5	32	63 1/4	26	57 1/4	24	55 1/4	23 1/4	55 1/2	1 1/8	32	1 1/2 x 11 1/8	542	22467		
22	33	4	30	41	25 1/2	36 1/2	24	35	23 1/4	34 1/4	1 1/2	21	1 1/2 x 10	305	39421		
22	67 1/4	4	30	75 1/4	25 1/2	71 1/4	24	69 1/4	23 1/4	69 1/2	1 1/2	42	1 1/2 x 10	610	22468		
24	36	3 1/2	32	44	28	40	26	38	25 1/4	37 1/4	2 1/2	27	1 1/2 x 10 1/2	412	36096		
24	73 3/4	3 1/2	32	81 1/4	28	77 1/4	26	75 1/4	25 1/4	75 1/2	2 1/2	54	1 1/2 x 10 1/2	824	22495		
24	30	5	34	40	28	34	26 1/4	32 1/4	26	32	3	24	1 1/2 x 8 1/2	294	33121		
24	62	5	34	72 1/2	28	66 1/4	26 1/4	64 1/2	26	64	3	48	1 1/2 x 8 1/2	588	22551		
24	36	5	34	46	28	40	26 1/4	38 1/4	26	38	3	24	1 1/2 x 10 1/2	366	33120		
24	74	5	34	84 1/4	28	78 1/4	26 1/4	76 1/4	26	76	3	48	1 1/2 x 10 1/2	732	22552		
33 1/4	21 1/4	3 1/4	40 1/4	28 1/4	38 1/4	26 1/4	36 1/4	24 1/4	36	24	2 1/4	24	1 1/2 x 10 5/8	370	22496		
36 1/4	21	4	42 1/4	30 1/2	39 1/4	24 1/2	38 1/4	23	38	22 1/4	1 1/8	28	1 1/2 x 9 3/8	380	22469		
39	32 1/2	4	48 1/2	41 1/2	43 1/4	36 1/8	41 1/4	34 1/8	41	34 1/8	1 1/4	48	1 1/2 x 9	472	22525		
40	32 1/4	4	48 1/4	41 1/8	43	35 1/8	41 1/4	34 1/8	41 1/2	33 1/8	1 1/4	48	1 1/2 x 9	472	22528		
41 1/8	36	5	52 1/8	46 1/4	45	39 1/8	43 1/2	38 1/4	43 1/4	38	2	42	1 1/2 x 11 1/4	688	22697		
41 1/4	33 1/2	5	49 1/4	42	45 1/2	37 1/2	43 1/4	36	43 1/2	35 1/4	1 1/4	42	1 1/2 x 9	546	23081		
41 1/2	45	5	50	54	45 1/2	49 1/2	44	48	43 1/2	47 1/2	1 1/4	56	1 1/2 x 10	812	22553		
45 1/4	26	5	55 1/4	36	49 1/4	30	24	28	47 1/2	27 1/4	1 1/8	32	1 1/2 x 11 1/8	542	23082		
45 1/4	33	4	53 3/4	41	49 1/4	36 1/2	47 1/4	35	47 1/2	34 1/4	1 1/2	42	1 1/2 x 10	610	23086		
49 1/4	36	3 1/2	57 1/4	44	53 1/4	40	51 1/4	38	51 1/2	37 1/4	2 1/2	54	1 1/2 x 10 1/2	824	23091		
50	30	5	60	40	54	34	52 1/4	32 1/4	52	32	3	48	1 1/2 x 8 1/2	588	22554		
50	36	5	60	46	54	40	52 1/4	38 1/4	52	38	3	48	1 1/2 x 10	732	22555		

frame										grating				openings			code no.
E	E'	D	F	F'	A	A'	B	B'	C	C'	T	no.	size	area			
ROADWAY type 326-D																	
12	36	6	20	44	15 1/2	39 1/2	14	38	13 1/4	37 1/4	2	28	38459	
12	74	6	20	82	15 1/2	77 1/4	14	76	13 1/4	75 1/4	2	56	22533	
16	28	6	28	40	19 1/8	31 1/8	18 1/8	30 1/8	18 1/8	30 1/8	3	36	1 1/2 x 3 3/8	185	32381		
16	58	6	28	71	19 1/8	62	18 1/8	60 1/2	18 1/8	60 1/4	3	72	1 1/2 x 3 3/8	370	22534		
19	22 1/4	8	26 1/2	31	21 1/4	25 1/4	20 1/4	24 1/4	20	24	1 1/4	30	1 1/8 x 3	129	29404		
19	32	4	28	41 1/8	22 1/2	35 1/8	21	34 1/8	20 1/4	33 1/8	1	35	2 x 3 1/4	197	32308		
19	45	5	28	54	23 1/2	49 1/2	22	48	21 1/4	47 1/2	1 1/4	60	22542	
19	45	5	28	54	23 1/2	49 1/2	22	48	21 1/4	47 1/2	3	60	22541	
19	66	4	28	75	22 1/2	69 1/2	21	68	20 1/4	67 1/4	1	70	2 x 3 1/4	394	22536		
19	93	5	28	102	23 1/2	97 1/2	22	96	21 1/4	95 1/2	3	120	22535	
24	36	3 1/2	32	44	28	40	26	38	25 1/4	37 1/4	2 1/2	72	1 1/8 x 3 1/2	366	31680		
24	74	3 1/2	32	82	28	78	26	76	25 1/4	75 1/2	2 1/2	144	1 1/8 x 3 1/2	732	22537		
26	46	6	34	54	29 1/2	49 1/2	28	48	27 1/4	47 1/4	1 1/2	80	2 x 3 3/8	471	22543		
26	94	6	34	102	29 1/2	97 1/2	28	96	27 1/4	95 1/2	1 1/2	160	2 x 3 3/8	942	22538		
27	46	6	36	55	30 1/2	49 1/2	29	48	28 1/4	47 1/4	1 1/4	90	1 1/8 x 3 1/2	520	29400		
27	94	6	36	103	29 1/2	97 1/2	29	96	28 1/4	95 1/2	1 1/4	180	1 1/8 x 3 1/2	1040	22539		
36	56	3 1/2	44	58	40	54	38	52	37 1/4	51 1/2	2 1/2	144	1 1/8 x 3 1/2	732	22544		
44	45	5	53	54	48 1/2	49 1/2	47	48	43 1/2	47 1/4	1 1/4	120	22540	
46	56	6	56 1/2	66 1/2	49 1/2	59 1/2	48	58	47 1/2	57 1/2	1 1/4	180	1 1/8 x 3 1/2	1040	22545		

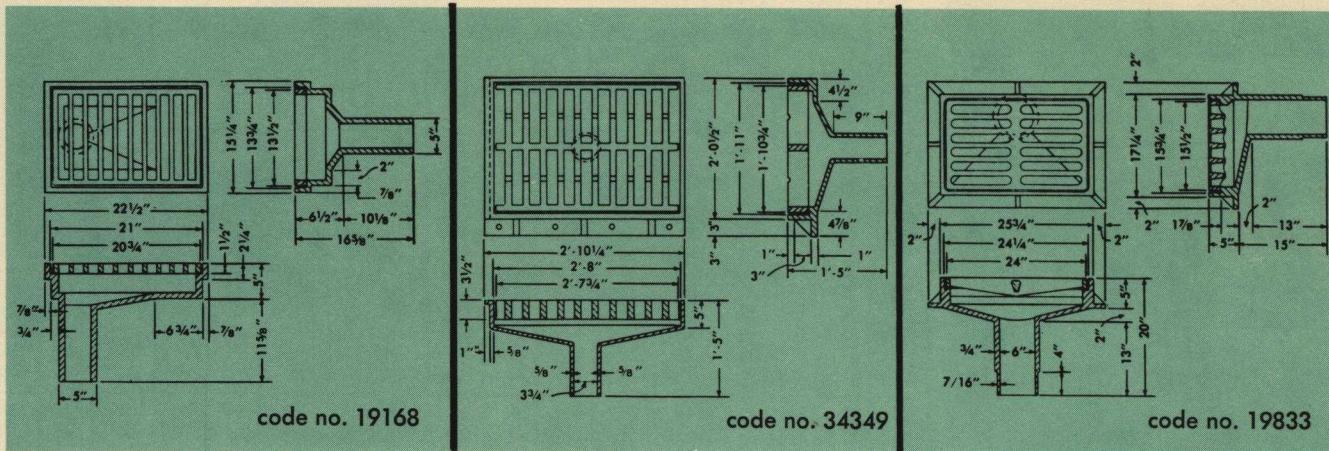
BRIDGE AND DECK SCUPPERS

These scuppers are typical, but many other types and sizes are available to suit your needs. Contact Flockhart Engineering Department.

variations: 1, 3, 4, 16, 19 (page 2)

ordering: see page 2
depth and diameter of outlet can be varied

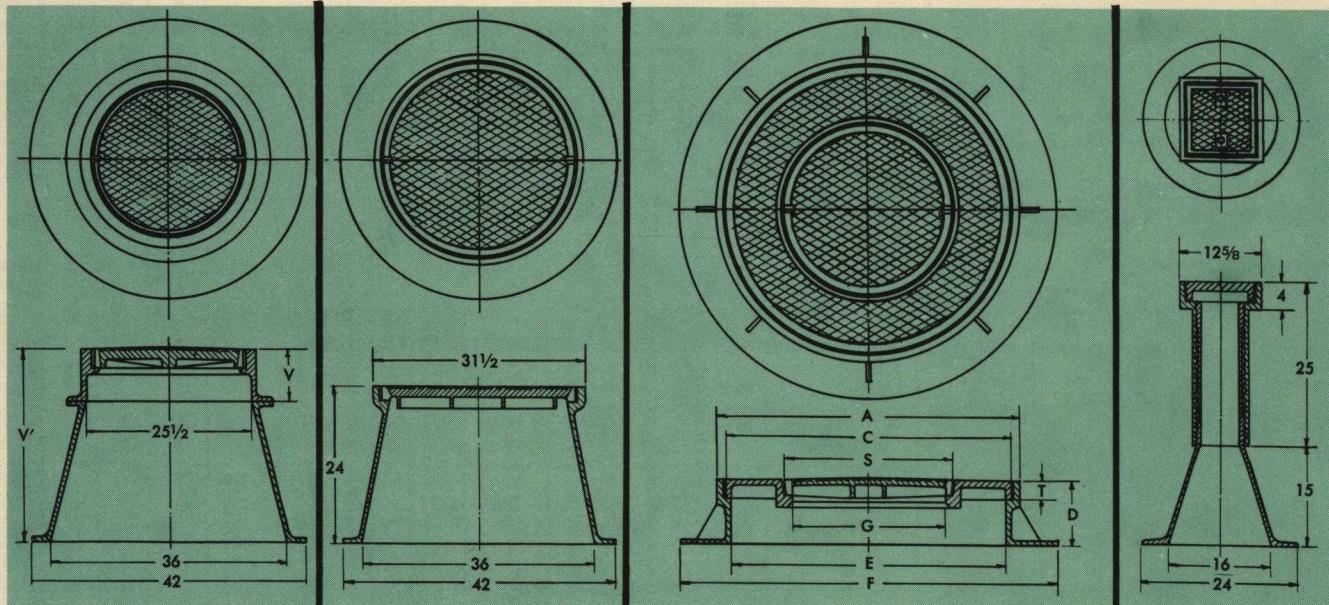
ductile iron or cast steel gratings available on specification



VALVE BOX FRAMES COVERS

● **circular** for pit construction **ROADWAY**

variations: 1, 2, 3, 4, 5, 6, 7, 8, 9, 15, 18, 19 (page 2)
guarantee: 10 years
ordering: see page 2



V | V' | code no.

type 660-A
skirt, frame, cover

6	30	61820
8	32	61821
9 1/2	33 1/2	61822
12	36	61823

type 660-B
skirt, cover

code no. 28610

E | A | G | D | F | C | T | S | code no.

type 660-C
frame, concentric covers

30	34 1/2	22	8	42	32	1 1/2	22	61828
36	41 1/2	21 1/8	8	48 1/2	37 3/4	1 1/8	23 3/4	61825
42	46 1/4	24	10	58	44 1/2	3	26	61826
48	53	22	8	60	49 5/8	1 1/2	24	61829
54	60	22	8	64	57 3/4	1 1/2	24	61830
60	66	22	8	70	66 3/4	1 1/2	24	61831

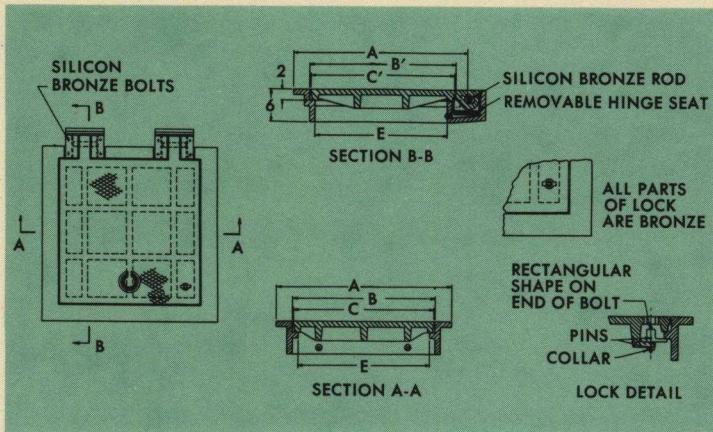
inner cover cast aluminum on request

type 660-D
frame, sleeve, cover

code no. 25284

MANHOLE FRAMES HINGED COVERS

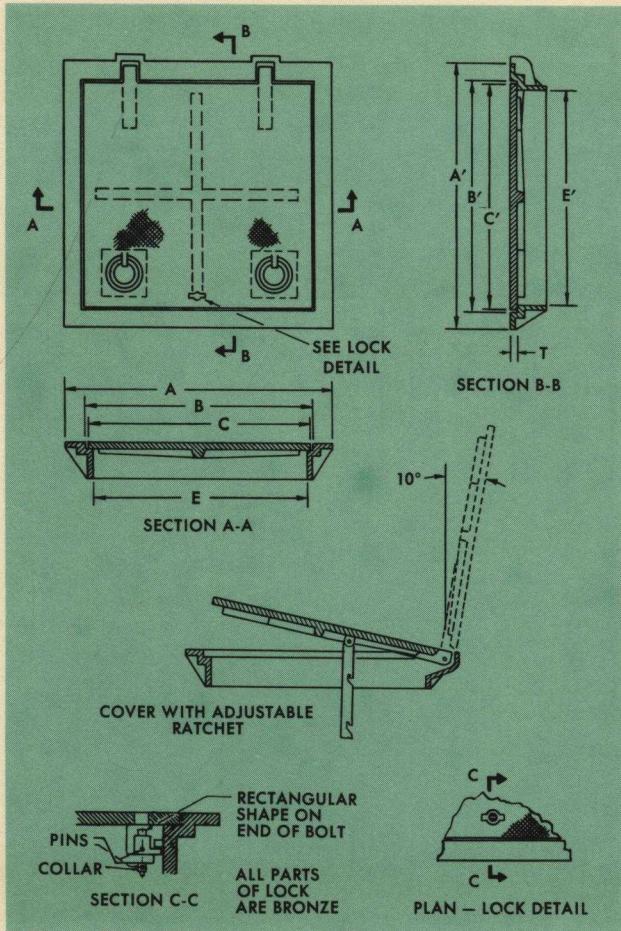
■ square • for slab construction



varyations: 7, 8, 9, 11, 12, 15, 18, 19 (page 2)
guarantee: ROADWAY types for 10 years
ordering: see page 2

frame	cover						code no.	
	E	A	B	B'	C	C'	without lock	with lock
ROADWAY type 644								
8	16	10	10½	9½	10½	19170	19171	
12	20	14	14½	13½	14½	19172	19173	
18	26	20	20½	19½	20½	19174	19175	
20	28	22	22½	21½	22½	19176	19177	
24	32	26	26½	25½	26½	19178	19179	
27	35	29	29½	28½	29½	19180	19181	
30	38	32	32½	31½	32½	19182	19183	
33	41	35	35½	34½	35½	19184	19185	
36	44	38	38½	37½	38½	19186	19187	
39	47	41	41½	40½	41½	19188	19189	
42	50	44	44½	43½	44½	19190	19191	

■ square or ■ rectangular • for slab construction



frame	cover						code no.				
	E	E'	A	A'	B	B'	C	C'	T	without lock	with lock
WALKWAY type 678											
6	7	12	13	8	9	7½	8½	½	15737		
12	12	18	18	14	14	13½	13½	½	16200	16201	
12	18	18	24	14	20	13½	19½	½	16202	16203	
12	24	18	30	14	26	13½	25½	½	16204	16205	
15	15	24	24	17	17	16½	16½	½	29810	29811	
18	18	24	24	20	20	19½	19½	¾	16206	16207	
18	27	24	33	20	29	19½	28½	¾	16208	16209	
18	36	24	42	20	38	19½	37½	¾	16210	16211	
24	42	30	48	26	44	25½	43½	¾	26577		
24	24	30	30	26	26	25½	25½	¾	16212	16213	
24	30	30	36	26	32	25½	31½	¾	15335		
24	36	30	42	26	38	25½	37½	¾	16214	16215	
24	48	30	54	26	50	25½	49½	¾	16216	16217	
30	30	36	36	32	32	31½	31½	¾	16218	16219	
30	45	36	51	32	47	31½	46½	¾	16220	16221	
30	60	36	66	32	62	31½	61½	¾	16222	16223	
36	36	42	42	38	38	37½	37½	¾	16224	16225	
36	54	42	60	38	56	37½	55½	¾	16226	16227	
36	72	42	78	38	74	37½	73½	¾	16228	16229	
42	42	48	48	44	44	43½	43½	¾	15180	15181	
42	63	48	69	44	65	43½	64½	¾	15182	15183	
42	84	48	90	44	86	43½	85½	¾	15184	15185	
48	48	54	54	50	50	49½	49½	¾	15186	15187	
48	72	54	78	50	74	49½	73½	¾	15188	15189	
48	96	54	102	50	98	49½	97½	¾	15190	15191	

- depth of frame 4 in. unless otherwise specified
- rectangular units larger than 24 in. x 36 in. with cover in two equal parts
- key cannot be removed unless cover is locked
- cast aluminum covers as specified
- ratchet only if specified

TROUGHS

with cover or grating

FLOCKHART troughs, with grating (or cover), are particularly suited to public buildings, garages, laundries, manufacturing plants, parking areas—also to shower rooms in schools, dormitories, stadia and factories. They eliminate the necessity and expense of forms for building trenches. They assure uniform bearing of the grating (or cover) on the trough.

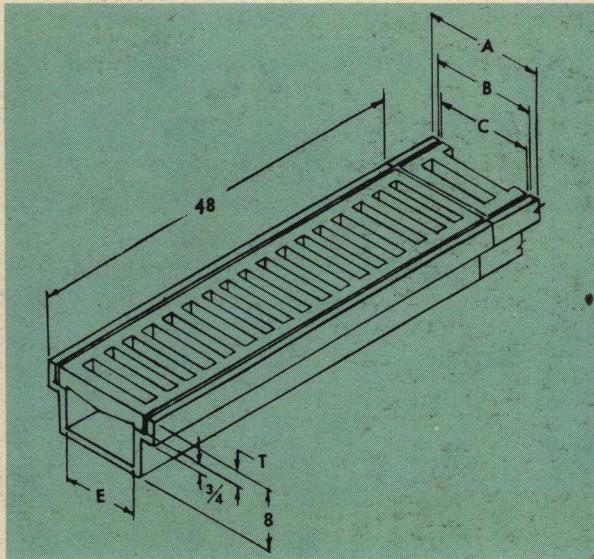
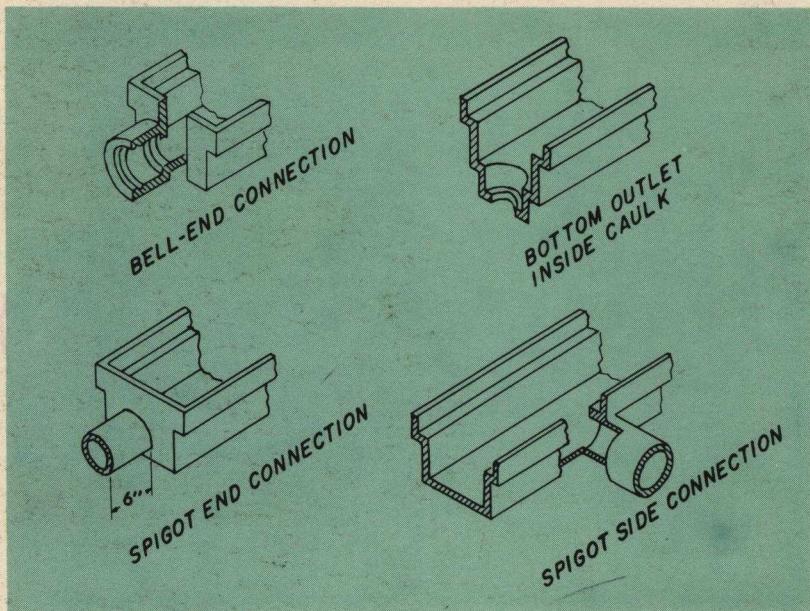
The sections, 48 in. long, are regularly furnished with open ends, butt joints and without pipe connections. However, these troughs can be furnished, when specified, with outlet pipe connections for extra heavy cast iron soil pipe.

For unusual requirements, these FLOCKHART troughs can be furnished with special features:

- special caulked joints between adjoining sections—for installations that must be watertight
- grating (or cover) secured to frame by silicon bronze bolts

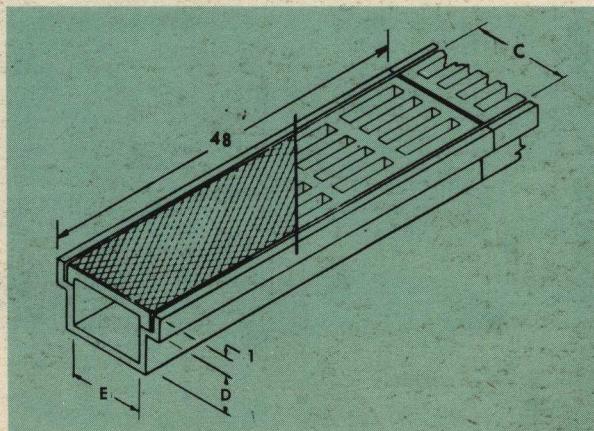
- grating (or cover) of aluminum or bronze

ordering: give type number and code number (from table); also state over-all length of assembly and any special requirements; sections with closed ends; outlet connections by size, type (spigot, bell, inside caulk)



also available with cover for roadway use
ordering: see page 2

E	A	B	C	T	cast fitting surfaces type A	milled horizontal fitting surfaces type B	milled horizontal & vertical fitting surfaces type C
ROADWAY type 646 with grating							
6	10 1/2	8 1/2	8 1/4	2	17300	17301	17302
8	12 1/2	10 1/2	10 1/4	2	17303	17304	17305
10	14 1/2	12 1/2	12 1/4	2	17306	17307	17308
12	16 1/2	14 1/2	14 1/4	2	17309	17310	17311
14	18 1/2	16 1/2	16 1/4	2 1/2	17312	17313	17314
16	20 1/2	18 1/2	18 1/4	2 1/2	17315	17316	17317
18	22 1/2	20 1/2	20 1/4	2 1/2	17318	17319	17320
20	24 1/2	22 1/2	22 1/4	2 1/2	16153	16154	16155
24	28 1/2	26 1/2	26 1/4	3	16159	16160	16161



can be made watertight either by lead caulking or by bolting
ordering: see page 2

E	C	D = 4"		D = 6"	
		cover	grating	cover	grating
WALKWAY type 689 with cover or grating					
4	5 1/4	17900	17901	17902	17903
6	7 1/4	17904	17905	17906	17907
8	9 1/4	17908	17909	17910	17911
10	11 1/4	17912	17913	17914	17915
12	13 1/4	17916	17917	17918	17919

TRENCH FRAMES

with cover or grating

covers and gratings for trench openings, W, wider than 12 in. made 24 in. long

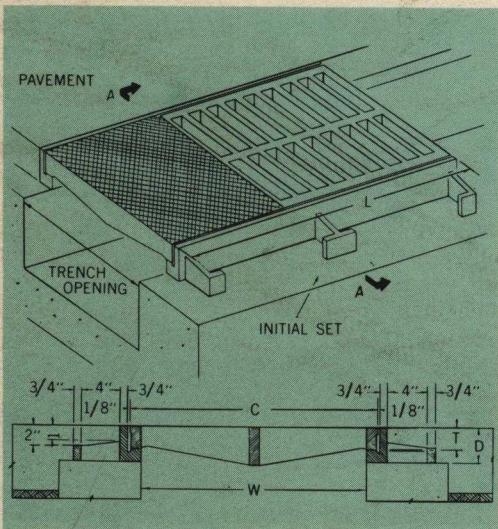
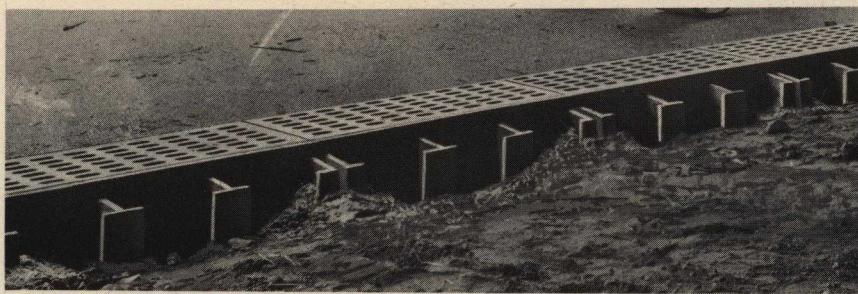
VARIATIONS: made of cast aluminum or bronze on order; frames bolted together with steel bolts when specified

GUARANTEE: ROADWAY types for ten years

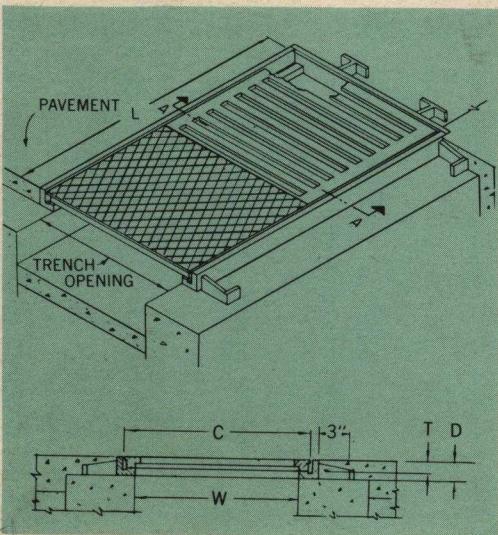
INSTALLATION:

- set each frame and grating as a unit
- adjust unit to proper plane and cement anchors to base for initial set
- after cement hardens, test unit for plane
- pour concrete

ORDERING: see page 2



W	L	C	T	D	cast fitting surfaces type A		milled horizontal fitting surfaces type B		milled horizontal & vertical fitting surfaces type C	
					672	679	672	679	672	679
ROADWAY type 672 with cover • type 679 with grating										
6	48	8 1/4	2	3	45400	41100	45401	41101	45402	41102
8	48	10 1/4	2	3	45403	41103	45404	41104	45405	41105
10	48	12 1/4	2	3	45406	41106	45407	41107	45408	41108
12	48	14 1/4	2	3	45409	41109	45410	41110	45411	41111
14	48	16 1/4	2 1/2	3 1/2	45412	41112	45413	41113	45414	41114
16	48	18 1/4	2 1/2	3 1/2	45415	41115	45416	41116	45417	41117
18	48	20 1/4	2 1/2	3 1/2	45418	41118	45419	41119	45420	41120
20	48	22 1/4	2 1/2	3 1/2	45421	41121	45422	41122	45423	41123
22	48	24 1/4	2 1/2	3 1/2	45424	41124	45425	41125	45426	41126
24	48	26 1/4	3	4	45427	41127	45428	41128	45429	41129
30	48	32 1/4	3	4	45430	41130	45431	41131	45432	41132
36	48	38 1/4	3	4	45433	41133	45434	41134	45435	41135
42	48	44 1/4	3	4	45436	41136	45437	41137	45438	41138
48	48	50 1/4	3	4	45439	41139	45440	41140	45441	41141
54	48	56 1/4	4	5	45442	41142	45443	41143	45444	41144
60	48	62 1/4	4	5	45445	41145	45446	41146	45447	41147



W	L	C	T	D	type A		type B		type C	
					1252	1253	1252	1253	1252	1253
WALKWAY type 1252 with cover • type 1253 with grating										
6	24	8	1 1/4	2	41000	41400	41001	41401	41002	41402
8	24	10	1 1/4	2	41003	41403	41004	41404	41005	41405
10	24	12	1 1/4	2	41006	41406	41007	41407	41008	41408
12	24	14	1 1/4	2	41009	41409	41010	41410	41011	41411
14	24	16	1 1/4	2	41012	41412	41013	41413	41014	41414
16	24	18	1 1/4	2	41015	41415	41016	41416	41017	41417
18	24	20	1 1/4	2	41018	41418	41019	41419	41020	41420
20	24	22	1 1/2	2 1/4	41021	41421	41022	41422	41023	41423
24	24	26	1 1/2	2 1/4	41024	41424	41025	41425	41026	41426
27	24	29	1 1/2	2 1/4	41027	41427	41028	41428	41029	41429
30	24	32	1 3/4	2 1/2	41030	41430	41031	41431	41032	41432
33	24	35	1 3/4	2 1/2	41033	41433	41034	41434	41035	41435
36	24	38	1 3/4	2 1/2	41036	41436	41037	41437	41038	41438
39	24	41	1 3/4	2 1/2	41039	41439	41040	41440	41041	41441
42	24	44	2	2 3/4	41042	41442	41043	41443	41044	41444
45	24	47	2	2 3/4	41045	41445	41046	41446	41047	41447
48	24	50	2	2 3/4	41048	41448	41049	41449	41050	41450
54	24	56	2	2 3/4	41051	41451	41052	41452	41053	41453
60	24	62	2	2 3/4	41054	41454	41055	41455	41056	41456

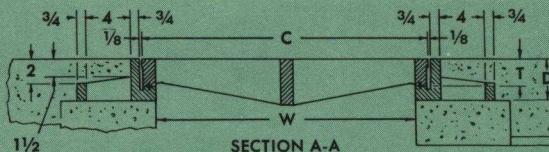
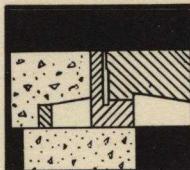
FRAMES GRATINGS FOR AIRPORT USE

These Flockhart castings are specially designed and formulated to handle the heavy wheel loads of military, continental and intercontinental aircraft. They are used alongside runways, on aprons and in hangars.

Their design loading conforms with the most recent CAA recommendations, used extensively by municipal and state agencies for their airports.



trench frame with grating • for pit construction extra heavy duty



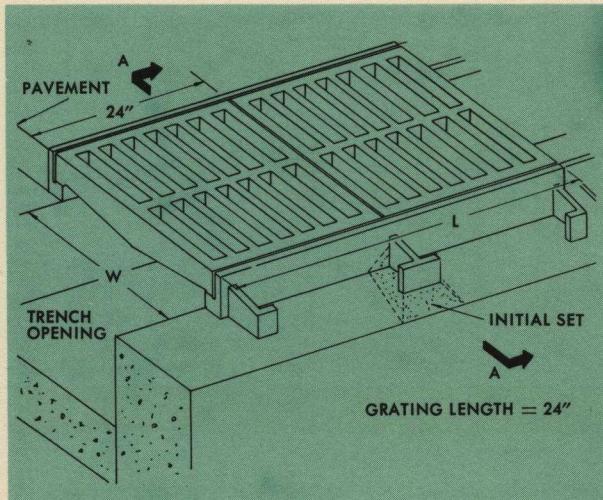
Frame made of cast iron; grating made of either cast iron or ductile iron depending on load and span. Load ratings shown in table are for uniformly distributed loads and cover the majority of existing wheel loads. However, when trench width is 36 inches or more, it is necessary, in specifying or ordering, to specify actual wheel load, also the contact area or type of plane. Seats of frame and grating milled for perfect bearing.

Variations, when specified, are available: frame sections bolted together with steel bolts; grating bolted to frame (stainless steel or bronze, as specified).

installation:

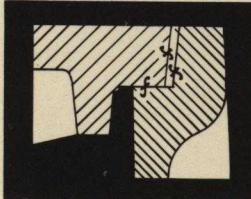
- set each frame and grating as a unit
- adjust unit to proper plane and cement anchors to base for initial set
- after cement hardens, test unit for plane

for roadway trench frames and cover or grating see page 23.



W	L	C	T	D	loading in lb per sq in.			
					110	143	200	243
type 688								
6	48	8 1/4	2	3	47100	47101	47102	47103
8	48	10 1/4	2	3	47104	47105	47106	47107
10	48	12 1/4	2	3	47108	47109	47110	47111
12	48	14 1/4	2	3	47112	47113	47114	47115
14	48	16 1/4	2 1/2	3 1/2	47116	47117	47118	47119
16	48	18 1/4	2 1/2	3 1/2	47120	47121	47122	47123
18	48	20 1/4	2 1/2	3 1/2	47124	47125	47126	47127
20	48	22 1/4	2 1/2	3 1/2	47128	47129	47130	47131
22	48	24 1/4	2 1/2	3 1/2	47132	47133	47134	47135
24	48	26 1/4	3	4	47136	47137	47138	47139
30	48	32 1/4	3	4	47140	47141	47142	47143
36	48	38 1/4	3	4	47144	47145	47146	47147
42	48	44 1/4	3	4	47148	47149	47150	47151
48	48	50 1/4	3	4	47152	47153	47154	47155
54	48	56 1/4	4	5	47156	47157	47158	47159
60	48	60 1/4	4	5	47160	47161	47162	47163

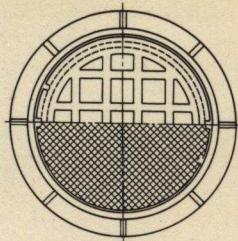
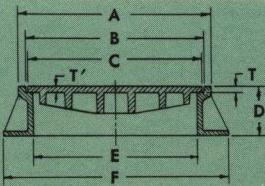
FRAMES GRATINGS FOR AIRPORT USE



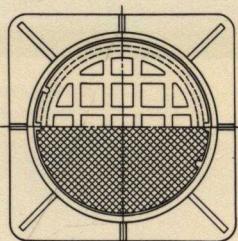
horizontal and vertical fitting surfaces of frame and cover shall be milled to a true and even surface

* indicates cast iron cover or grating

T¹ depends on loading



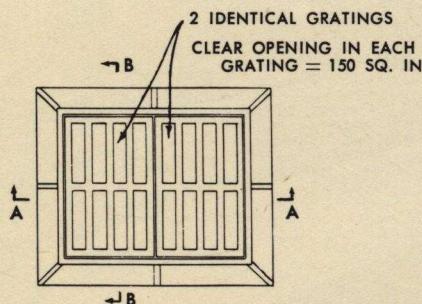
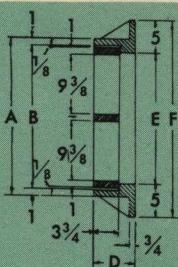
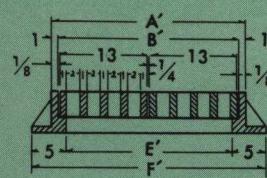
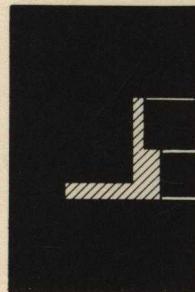
E	D	F	A	B	frame	cover	circular flange			square flange		
							C	T	loading—lbs. per sq. inch	110	143	243
type 1126-C with cast steel cover												
24	8	34	28½	26	25¾	1¾	*21300	*21301	21302	*21303	*21304	21305
27	8	37	31½	29	28¾	1¾	*21306	*21307	21308	*21309	*21310	21311
30	8	40	34½	32	31¾	1¾	*21312	21313	21314	*21315	21316	21317
32	8	42	36½	34¼	34	1½	21318	21319	21320	21321	21322	21323
36	8	46	41	38½	38	1½	21324	21325	21326	21327	21328	21329
42	8	52	46¾	44¼	44	2	21330	21331	21332	21333	21334	21335
48	8	58	53	50½	50	2½	21336	21337	21338	21339	21340	21341



E	D	F	A	B	frame	cover	grate			circular flange			square flange		
							C	T	loading—lbs. per sq. inch	110	143	243	110	143	243
type 667-C with cast steel grating															
24	8	34	28½	26	25¾	1¾	*19200	*19201	19202	*19203	*19204	19205			
27	8	37	31½	29	28¾	1¾	*19206	*19207	19208	*19209	*19210	19211			
30	8	40	34½	32	31¾	1¾	*19212	19213	19214	*19215	19216	19217			
32	8	42	36½	34¼	34	1½	19218	19219	19220	19221	19222	19223			
36	8	46	41	38½	38	1½	19224	19225	19226	19227	19228	19229			
42	8	52	46¾	44¼	44	2	19230	19231	19232	19233	19234	19235			
48	8	58	53	50½	50	2½	19236	19237	19238	19239	19240	19241			

inlet frame with grating extra heavy duty

rectangular • for pit construction



E x E'	D	F x F'	A x A'	B x B'	no. of gratings	free area	code no.
type 687							
20 x 24½	6	30 x 34½	24 x 28½	22 x 26½	2	60%	34343
20 x 37½	6	30 x 47½	24 x 41½	22 x 39½	3	60%	34344
20 x 50¾	6	30 x 60¾	24 x 54¾	22 x 53¾	4	60%	34345

Frame made of cast iron ASTM A-48, class 30; grating made of ductile iron ASTM A-339—for 65,000 lb wheel load or 230 psi uniformly distributed load.

Frame designed with substantial flange for proper distribution of pressure to supporting structure. Grating designed with deep seating to prevent movement under wheel load; made in multiple sections to facilitate cleaning of catch basin.

ARMORED CONCRETE

for sidewalk curb, loading platforms

ARMORED CONCRETE is concrete with the exposed vertical surfaces armored with grey cast iron. This armor is bonded to the concrete in such a manner that no part of it can vibrate in the slightest degree. Consequently there can be no fracture of the iron. Since cast iron is substantially incompressible, the force of an impact is so widely distributed that the concrete is undamaged. The resistance of the cast iron element to abrasion and corrosion is evident. The coefficients of expansion of cast iron and concrete are for all practical purposes identical; thus ARMORED CONCRETE is unaffected by variations of temperature.

advantages

- impact resistance: the only commercially known building material that resists impact perfectly
- abrasion resistance: all surfaces subject to abrasion are protected by the cast iron component
- corrosion resistance: the corrosion of cast iron is negligible
- temperature variation: no effect

testing

In 1924, initial installations of ARMORED CONCRETE were made at selected points in metropolitan New York. Locations were purposely selected which would subject the construction to the most severe impact and abrasion conditions. Not one failure has occurred. Since 1924, hundreds of ARMORED CONCRETE installations have been made in all parts of the country—many where other types of construction had failed. *In all instances, ARMORED CONCRETE has withstood the double test of time and performance.*

representative installations

United States Government
U. S. Military Academy, West Point

Port of New York Authority
Idlewild International Airport
Tri-Borough Bridge safety islands
Island Terminal No. 1
Holland Tunnel approaches
Lincoln Tunnel approaches

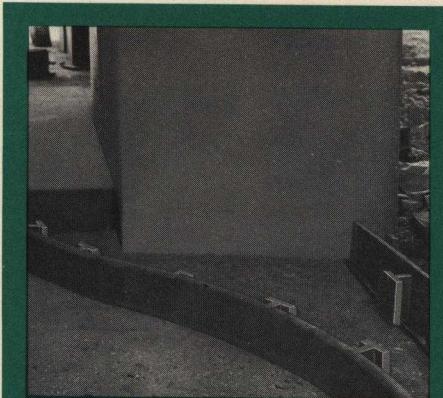
New York City Tunnel Authority
Queens Midtown Tunnel approaches

New York Central System
Grand Central Terminal

United Nations
Headquarters, New York City

New York City
Henry Hudson Parkway toll booth islands

Pennsylvania Railroad
Newark station



guarantee

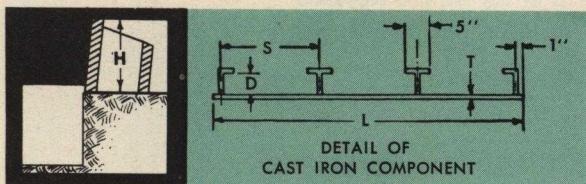
Providing the method of installation is directed by us, any cast iron component which may crack within ten years from invoice date will be replaced gratis, fob nearest railroad station. In addition, a cash refund equal to the purchase price of the cast iron component will be made.



ARMORED CONCRETE

for sidewalk curb, loading platforms

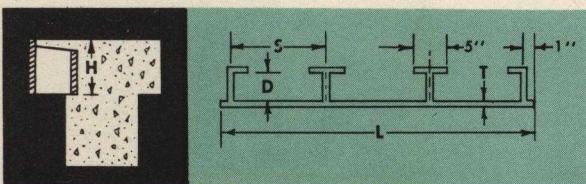
for sidewalk curb



Batter, unless otherwise specified, 2°. Except for radial sections, any batter can be obtained by proper setting of casting. For radial sections, specify batter required.

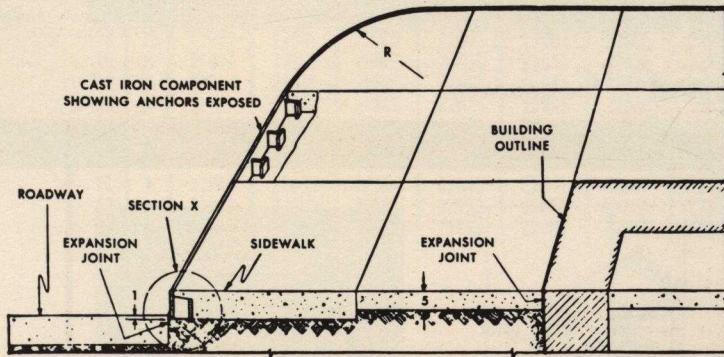
dimensions
H as required
L 6½ ft max
T ¾ to 7/8 in.
D 4 in.
S 18 in. max
R as required

for loading platforms

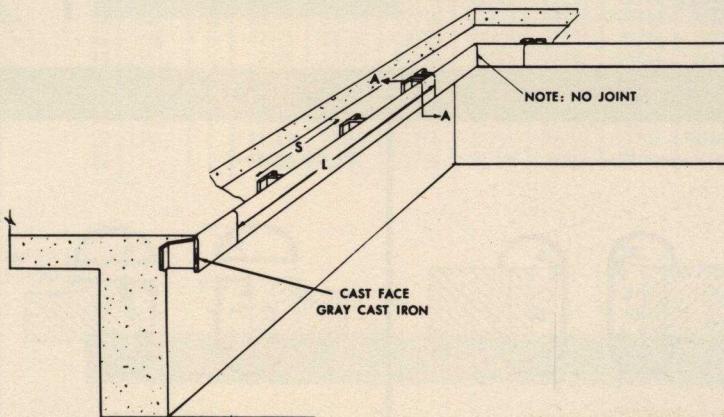


guarantee: 10 years
dimensions
H 6, 8, 10, 12 in. or as specified
T 7/8 to 1 in.
S 20 in.
D 6 in. min
L 48 in. or as required

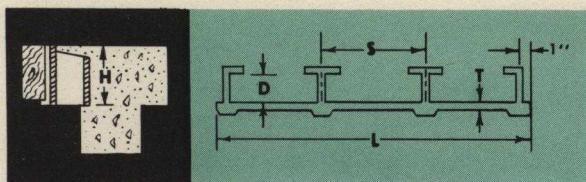
type 700



type 754 without provision for wood bumper



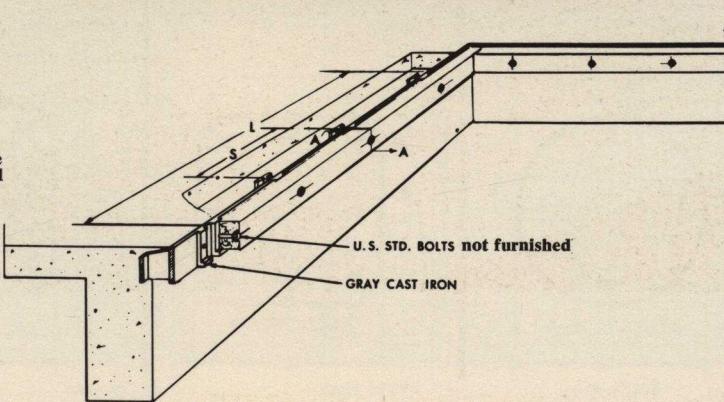
for loading platforms



This type has the necessary tapped holes for attaching a renewable wooden bumper to prevent damage to vehicles. (Wood bumper and bolts not furnished).

guarantee: 10 years
dimensions
H 6, 8, 10, 12 in. or as specified
T 7/8 to 1 in.
S 20 in. max
D 6 in. min
L 48 in. or as required
holes tapped 1/2 inch A.S.T.

type 755 with provision for wood bumper



WHEEL GUARDS

armored concrete

FLOCKHART wheel guards of the armored concrete type are concrete with the exposed vertical surfaces armored with grey cast iron. This armor is bonded to the concrete in such a manner that no part of it can vibrate in the slightest degree. Consequently there can be no fracture of the iron. Since cast iron is substantially incompressible, the force of an impact is so widely distributed that the concrete is undamaged. The resistance of the cast iron element to abrasion and corrosion is evident. The coefficients of expansion of cast iron and concrete are for all practical purposes identical; thus, wheel guards of the armored concrete type are unaffected by variations of temperature.

guarantee

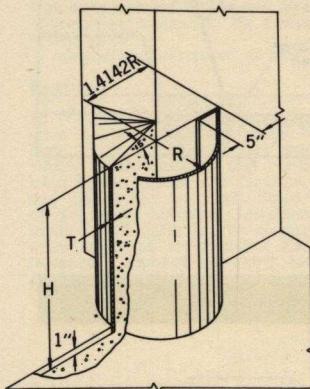
Providing the method of installation is directed by us, any cast iron component which may crack within ten years from invoice date will be replaced gratis, fob nearest railroad station. In addition, a cash refund equal to the purchase price of the cast iron component will be made.

dimensions

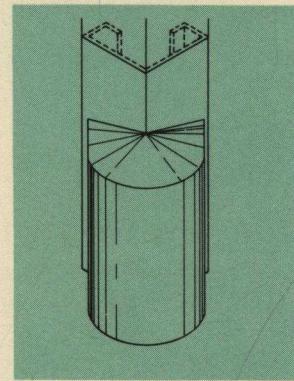
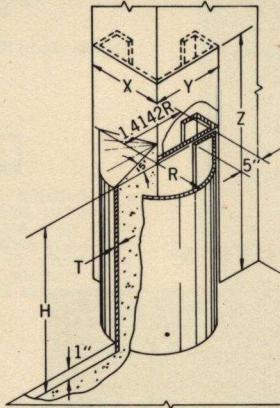
H, R, L, X, Y, Z: as specified
D 4 in.
T $\frac{7}{16}$ to 1 in.
C 7 in. min
V variable

round • for doorways

type 706-C without column protection

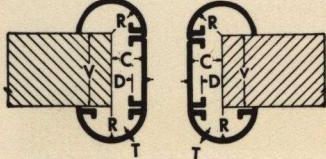


type 706-D with column protection



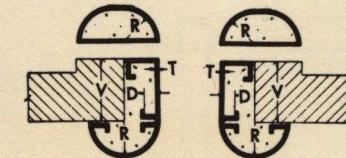
type 707-A

oval
for open doorway



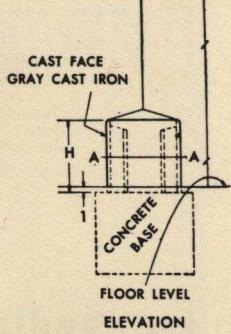
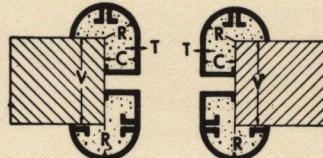
type 707-B

for sliding door



type 707-C

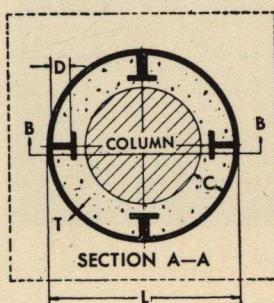
for overhead door



for columns

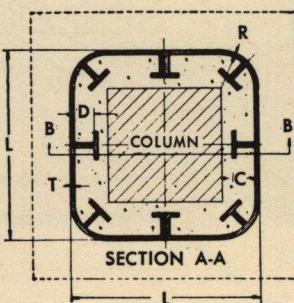
type 710-A

round



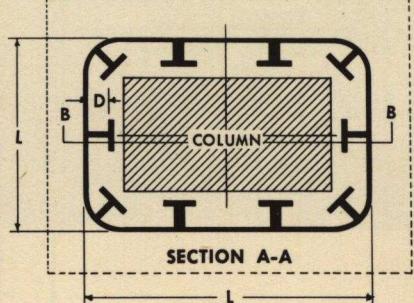
type 710-B

square

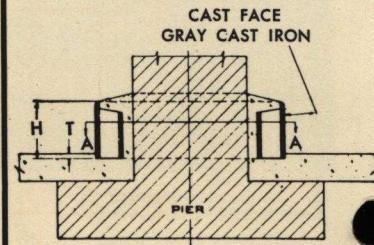


type 710-C

rectangular



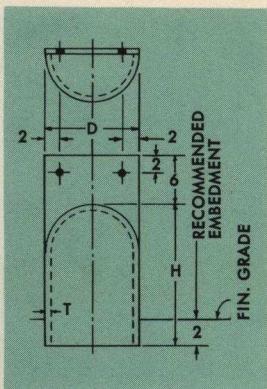
section AA for
ARMORED CONCRETE
wheel guards for columns
shown at left



WHEEL GUARDS

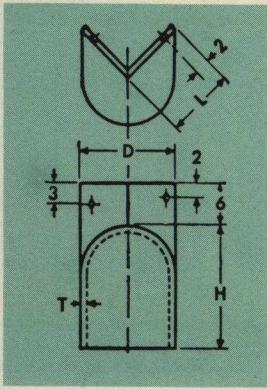
bolted

180°



- made of finest quality close-grained grey iron
 - bolt holes: $\frac{1}{8}$ in. diam, cored
 - grout hole: only when specified
- guarantee:** for 10 years
for other sizes, write for information

90°



- made of finest quality close-grained grey iron
 - bolt holes: $\frac{1}{8}$ in. diam, cored
 - grout hole: only when specified
- guarantee:** for 10 years
for other sizes, write for information

90°

- made of finest quality close-grained grey iron
- thickness: $\frac{1}{8}$ to 1 in.
- bolt holes: $\frac{1}{8}$ in. diam, cored
- grout hole: only when specified

guarantee: for 10 years
ordering: by code number

D	T	H-12	H-18	H-24	H-30	H-36	H-42	H-48
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type 649

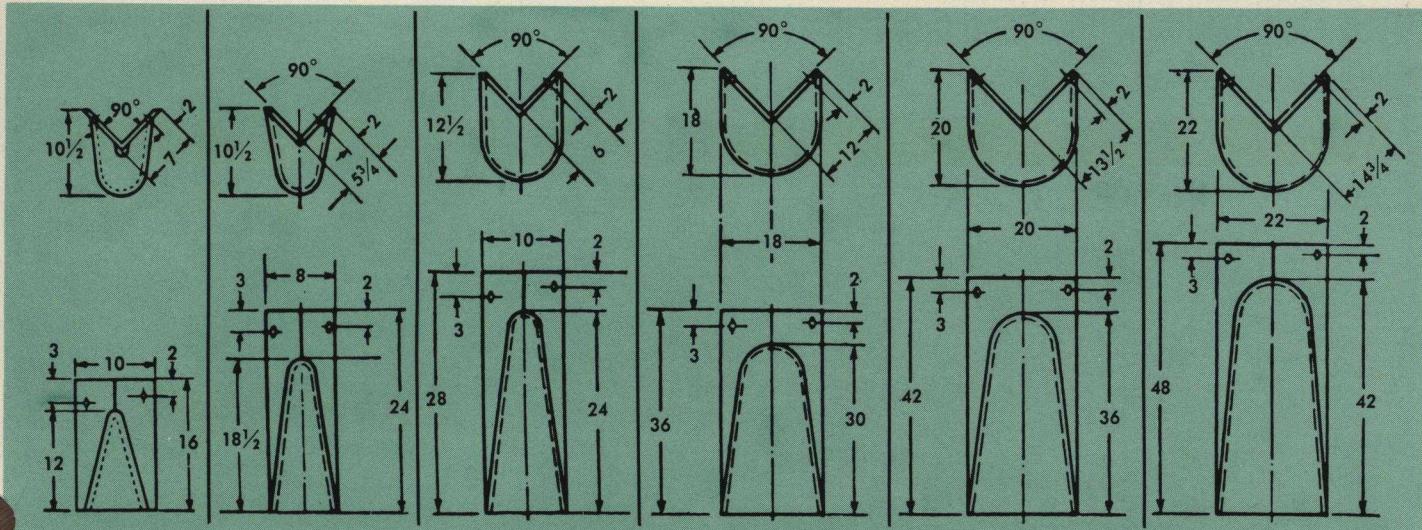
8	$\frac{7}{8}$	22800	22801	22802	22803	22804	22805	22806
10	$\frac{7}{8}$	22807	22808	22809	22810	22811	22812	22813
12	$\frac{7}{8}$	22814	22815	22816	22817	22818	22819	22820
14	$\frac{7}{8}$	22821	22822	22823	22824	22825	22826	22827
16	$\frac{7}{8}$	22828	22829	22830	22831	22832	22833	22834
18	1	22835	22836	22837	22838	22839	22840	22841
20	1	22842	22843	22844	22845	22846	22847	22848
22	1	22849	22850	22851	22852	22853	22854	22855
24	1	22856	22857	22858	22859	22860	22861	22862

D	L	T	H-12	H-18	H-24	H-30	H-36	H-42	H-48
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type 647

8	$5\frac{1}{8}$	$\frac{7}{8}$	22700	22701	22702	22703	22704	22705	22706
10	$7\frac{1}{16}$	$\frac{7}{8}$	22707	22708	22709	22710	22711	22712	22713
12	$8\frac{1}{2}$	$\frac{7}{8}$	22714	22715	22716	22717	22718	22719	22720
14	$9\frac{1}{8}$	$\frac{7}{8}$	22721	22722	22723	22724	22725	22726	22727
16	$11\frac{5}{16}$	$\frac{7}{8}$	22728	22729	22730	22731	22732	22733	22734
18	$12\frac{1}{16}$	1	22735	22736	22737	22738	22739	22740	22741
20	$14\frac{1}{8}$	1	22742	22743	22744	22745	22746	22747	22748
22	$15\frac{1}{16}$	1	22749	22750	22751	22752	22753	22754	22755
24	17	1	22756	22757	22758	22759	22760	22761	22762

type 648



code 35466

code 27291

code 27292

code 27293

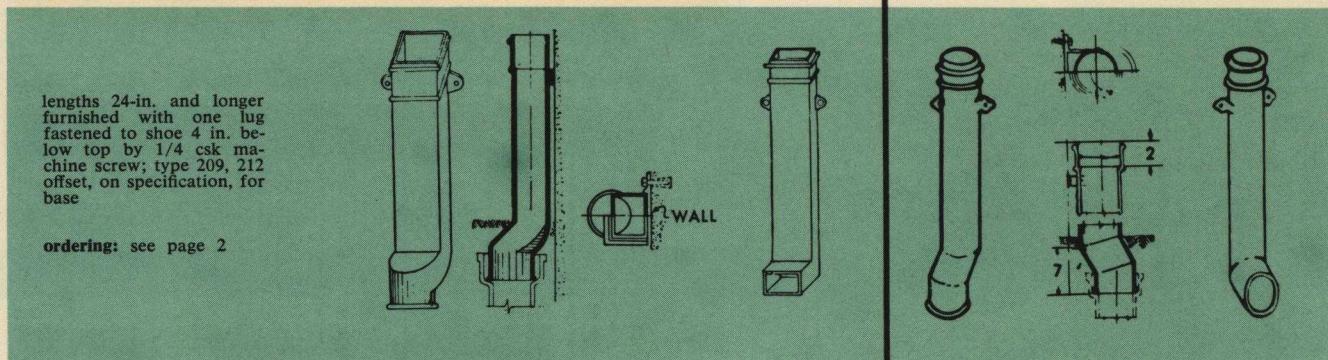
code 27294

code 27295

RELATED PRODUCTS

leader shoes

square, rectangular



length in.	dimensions, in.													
	2 x 2	2 x 3	2 x 4	3 x 3	3 x 4	3 x 5	4 x 4	4 x 5	4 x 6	4 x 8	5 x 5	5 x 8	6 x 6	6 x 8

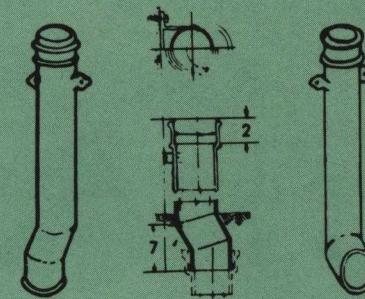
type 209 for soil pipe connection

12	34000	34008	39800	34016	34025	22240	34033	34041	37700	37710	34850	37720	37730	39500
18	34001	34009	39801	34017	34026	22241	34034	34042	37701	37711	34851	37721	37731	39501
24	34002	34010	39802	34018	34027	22242	34035	34043	37702	37712	34852	37722	37732	39502
30	34003	34011	39803	34019	34028	22243	34036	34044	37703	37713	34853	37723	37733	39503
36	34004	34012	39804	34021	34029	22244	34037	34045	37704	37714	34854	37724	37734	39504
42	34005	34013	39805	34022	34030	22245	34038	34046	37705	37715	34855	37725	37735	39505
48	34006	34014	39806	34023	34031	22246	34039	34047	37706	37716	34856	37726	37736	39506
54	34007	34015	39807	34024	34032	22247	34040	34048	37707	37717	34857	37727	37737	39507
60	34500	34502	39808	34504	34506	22248	34508	34510	37708	37718	34858	37728	37738	39508
66	22380	22381	39809	22382	22383	22249	22384	22385	22386	22387	34859	22388	22389	22390
72	34501	34503	39810	34505	34507	22250	34509	34511	37709	37719	34860	37729	37739	39509
84	39400	39401	39811	34402	39403	22251	39404	39405	39406	39407	34861	39408	39409	39510

type 210 for surface drainage

12	14800	14812	14824	14836	14848	14860	14872	14884	14896	14908	14920	14932	14944	14956
18	14801	14813	14825	14837	14849	14861	14873	14885	14897	14909	14921	14933	14945	14957
24	14802	14814	14826	14838	14850	14862	14874	14886	14898	14910	14922	14934	14946	14958
30	14803	14815	14827	14839	14851	14863	14875	14887	14899	14911	14923	14935	14947	14959
36	14804	14816	14828	14840	14852	14864	14876	14888	14900	14912	14924	14936	14948	14960
42	14805	14817	14929	14841	14853	14865	14877	14889	14901	14913	14925	14937	14949	14961
48	14806	14818	14830	14842	14854	14866	14878	14890	14902	14914	14926	14938	14950	14962
54	14807	14819	14831	14843	14855	14867	14879	14891	14903	14915	14927	14939	14951	14963
60	14808	14820	14832	14844	14856	14868	14880	14892	14904	14916	14928	14940	14952	14964
66	14809	14821	14833	14845	14857	14869	14881	14893	14905	14917	14929	14941	14953	14965
72	14810	14822	14834	14846	14858	14870	14882	14894	14906	14918	14930	14942	14954	14966
84	14811	14823	14835	14847	14859	14871	14883	14895	14907	14919	14931	14943	14955	14967

circular



length in.	diameter, in.				
	3	4	5	6	8

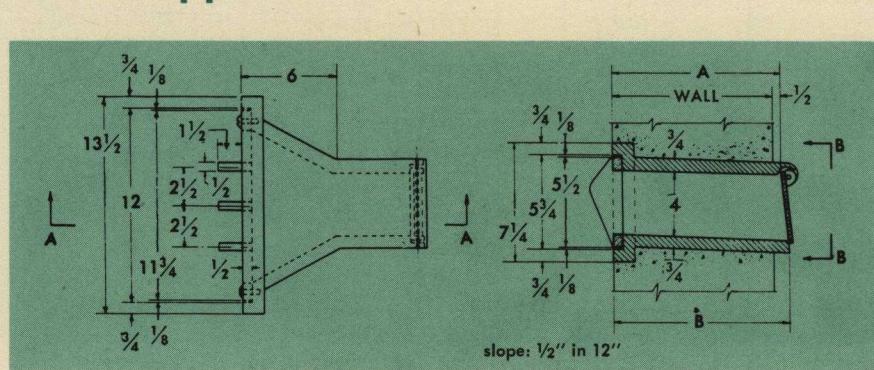
type 212 for soil pipe connection

12	34300	34308	34316	34324	20100
18	34301	34309	34317	34325	20101
24	34302	34310	34318	34326	20102
30	34303	34311	34319	34327	20103
36	34304	34312	34320	34328	20104
42	34305	34313	34321	34329	20105
48	34306	34314	34322	34330	20106
54	34307	34315	34323	34331	20107

type 213 for surface drainage

12	34400	34410	34420	34430	20110
18	34401	34411	34421	34431	20111
24	34402	34412	34422	34432	20112
30	34403	34413	34423	34433	20113
36	34404	34414	34424	34434	20114
42	34405	34415	34425	34435	20115
48	34406	34416	34426	34436	20116
54	34407	34417	34427	34437	20117
60	34408	34418	34428	34438	20118
72	34409	34419	34429	34439	20119

wall scuppers



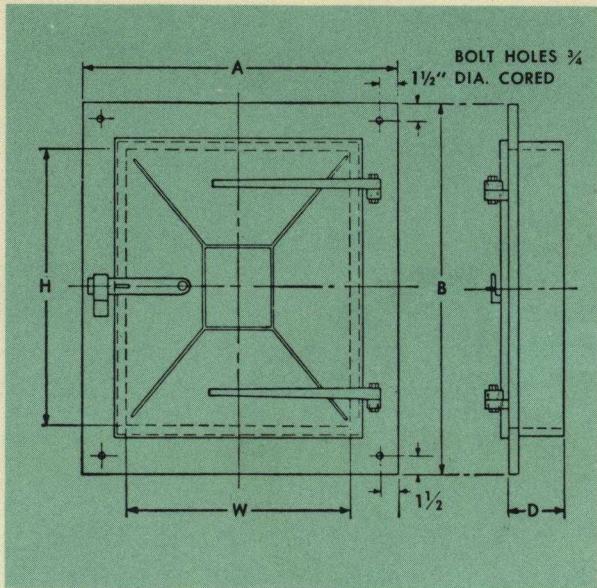
dimension B may be varied

ordering: see page 2

wall size	A	B	all bronze	all aluminum	body-gray C.I. flap-cast brz grate-cast brz
6	6 1/2	7	16874	16870	22150
8	8 1/2	9	16875	16871	22151
10	10 1/2	11	16876	16872	22152
12	12 1/2	13	16877	16873	22153

RELATED PRODUCTS

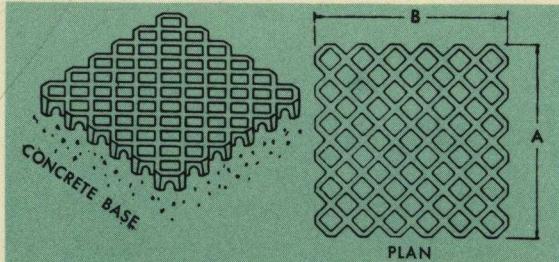
clean-out frame with door



variations: milled bearing surfaces on frame and door; padlocked provision; baffle plates; arched top; provision for fire brick; gas tight service

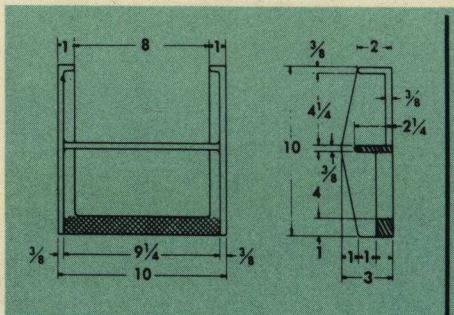
ordering: see page 2

grid

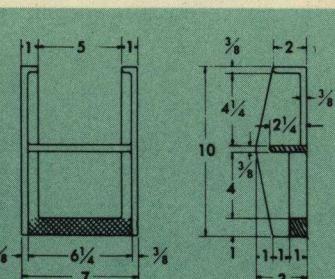


manhole steps

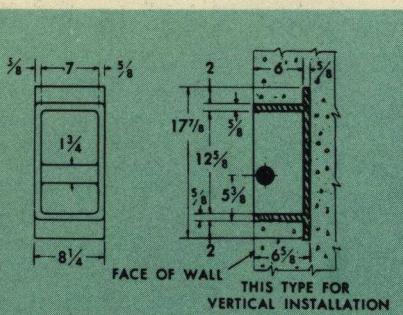
cast aluminum, steel and wrought iron types available on request



code 32206



code 30712



code 31666

ordering: by code number

to provide a surface resistant to traction, impact, abrasion and corrosion
ordering: see page 2

type 493 cast iron for concrete floors

A	B	code no.
thickness, T: 3/4 in.		
12	12	38495-G
12	24	37428-G

thickness, T: 1 1/8 in.

12	6	17526-G
12	12	17524-G
12	24	17525-G

FOUNDED 1879

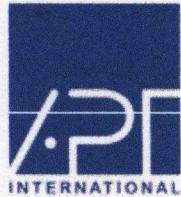


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